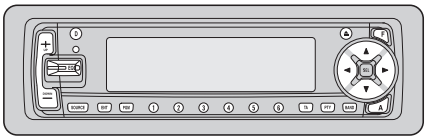
Pioneer

Service Manual



ORDER NO.
CRT2352

MULTI-CD/MD/DAB CONTROL HIGH POWER CD PLAYER WITH RDS TUNER

DEH-P8000R

EW

COMPACT disc DIGITAL AUDIO

- **See the separate manual CX-916(CRT2300) for the CD mechanism description, disassembly and circuit description.**
- **The CD mechanism employed in this model is one of S8 series.**

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PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

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K-ZZB. APR. 1999 Printed in Japan

● **CD Player Service Precautions**

1. For pickup unit(CXX1285) handling, please refer to"Disassembly"(see page 53).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. Please checking the grating after changing the service pickup unit(see page 47).

1. SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

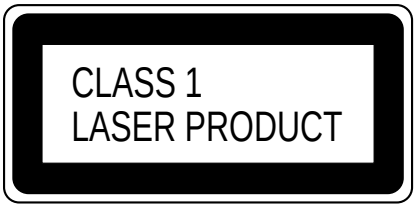
1. Safety Precautions for those who Service this Unit.

- **When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.**

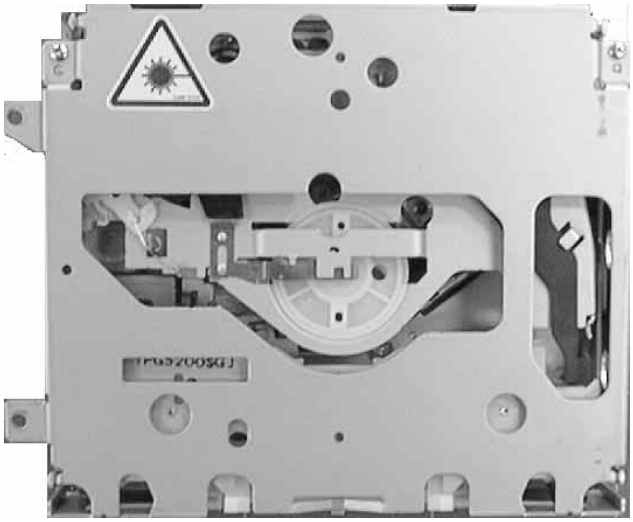
Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.



3. The triangular label is attached to the mechanism unit frame.

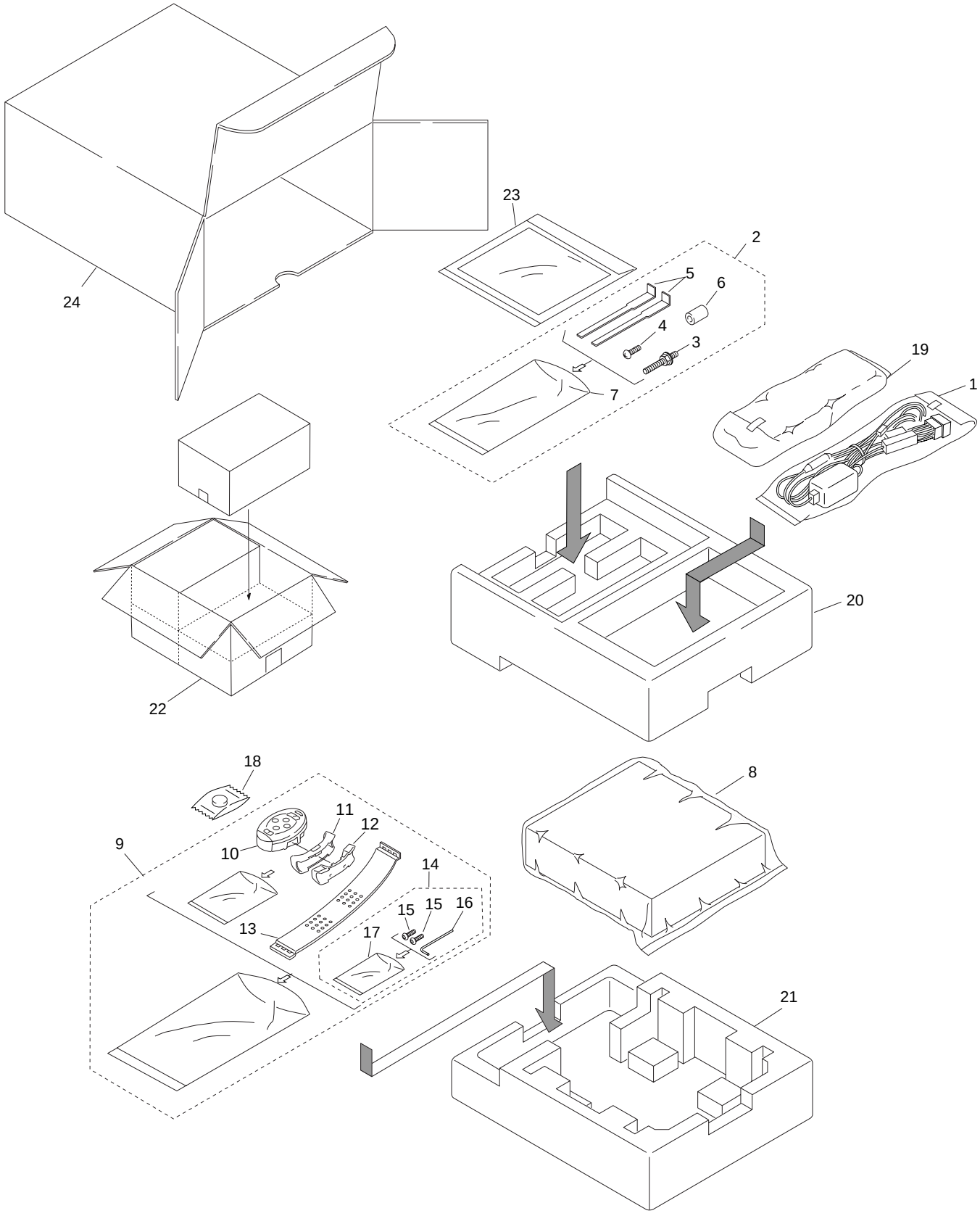


4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 800 nanometers

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



NOTE:

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.

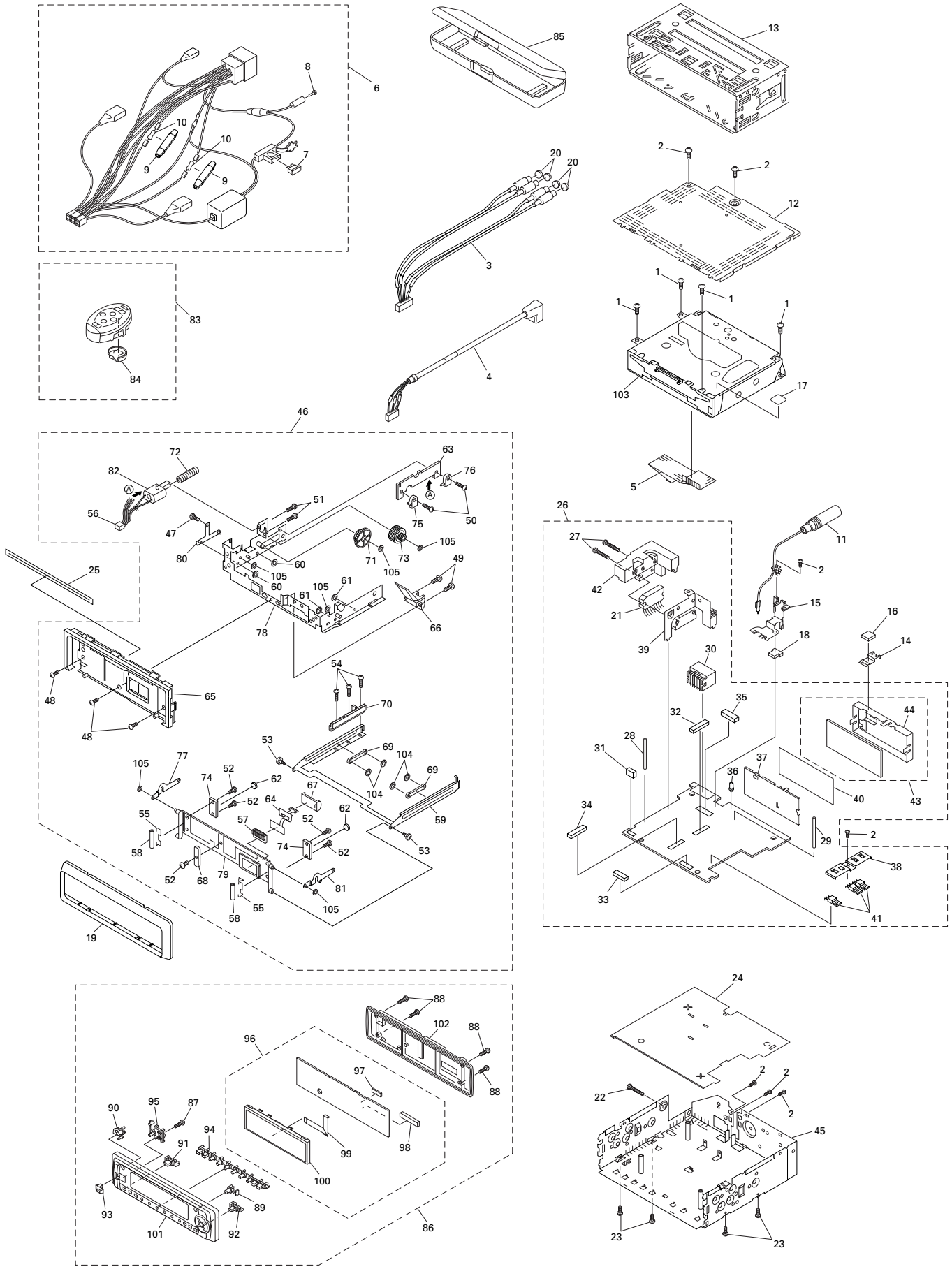
● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Cord Assy	CDE5855
	2	Accessory Assy	CEA2538
	3	Screw	CBA1002
	4	Screw	CBA1120
	5	Handle	CNC5395
	6	Bush	CNV1917
*	7	Polyethylene Bag	E36-615
*	8	Cover	CEG1088
	9	Remote Control Assy	CXB3488
	10	Remote Control Assy	CZX3231
	11	Holder Assy	CZX3172
	12	Holder Assy	CZX3173
	13	Belt	CZN6416
	14	Screw Assy	CZE3169
*	15	Screw	RMZ30H060FBK
*	16	Hexagonal Wrench	CZE3176
*	17	Polyethylene Bag	CEG-127
	18	Battery	CEX1030
	19	Case Assy	CXB3520
	20	Protector	CHP2032
	21	Protector	CHP2033
	22	Contain Box	CHL3774
	23-1	Owner's Manual	CRD2976
	23-2	Owner's Manual	CRD2977
	23-3	Owner's Manual	CRD2978
	23-4	Installation Manual	CRD2979
*	23-5	Caution Card	CRP1207
	23-6	Caution Card	CRP1208
	23-7	Passport	CRY1013
*	23-8	Warranty Card	CRY1087
	23-9	Polyethylene Bag	CEG1116
*	23-10	Caution Card	CRP1210
	24	Carton	CHG3774

● Owner's Manual, Installation Manual

Part No.	Language
CRD2976	English, Spanish
CRD2977	German, French
CRD2978	Italian, Dutch
CRD2979	English, Spanish, German, French, Italian, Dutch

2.2 EXTERIOR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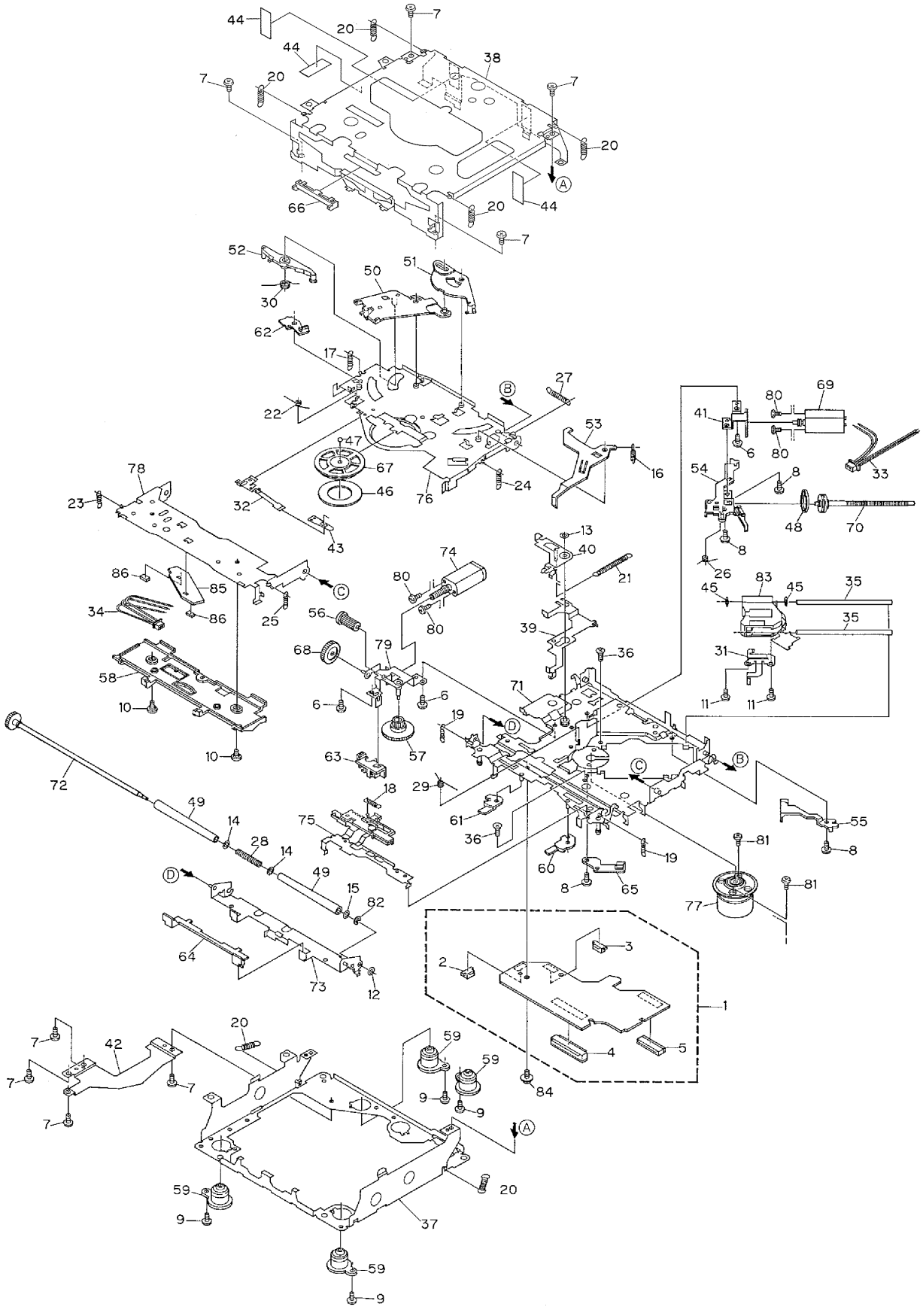
● EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BSZ26P060FMC
	2	Screw	BSZ30P050FMC
	3	Cord Assy	CDE5841
	4	Cord Assy	CDE5842
	5	Connector	CDE5846
	6	Cord Assy	CDE5855
	7	Fuse(10A)	CEK1136
	8	Terminal Cap	CKX-003
	9	Cap	CNS1472
	10	Resistor	RS1/2PMF102J
	11	Antenna Cable	CDH1256
	12	Case	CNB2426
	13	Holder	CNC6798
	14	Earth Terminal	CNC7358
	15	Holder	CNC8170
	16	Spacer	CNM6482
	17	Cushion	CNM6065
	18	Cushion	CNM6133
	19	Panel	CNS5256
	20	Cap	CNV2680
	21	IC(IC301)	PAL005A
	22	Screw	BSZ30P200FMC
	23	Screw	CBA1447
	24	Insulator	CNM6135
	25	Cover	CNM6489
	26	Tuner Amp Unit	CWM6220
	27	Screw	BMZ26P160FMC
	28	Clamper	CEF1004
	29	Clamper	CEF1009
	30	Plug(CN901)	CKM1278
	31	Plug(CN851)	CKS-786
*	32	Plug(CN101)	CKS1058
	33	Connector(CN801)	CKS1532
	34	Connector(CN991)	CKS1960
	35	Connector(CN351)	CKS3602
	36	Mini Jack(CN451)	CKX1046
	37	Holder	CNC7533
	38	Holder	CNC8168
	39	Holder	CNC8169
	40	Insulator	CNM5967
	41	Transistor(Q803,921,998)	2SD2396
	42	Heat Sink	CNR1535
	43	FM/AM Tuner Unit	CWE1500
	44	Holder	CNC7532
	45	Chassis Unit	CXB3558

Mark	No.	Description	Part No.
	46	Panel Assy	CXB3580
	47	Screw	BMZ20P030FMC
	48	Screw	CBA1154
	49	Screw	BPZ20P060FMC
	50	Screw	CBA1060
	51	Screw	CBA1061
	52	Screw	CBA1082
	53	Screw	CBA1430
	54	Screw	CBA1454
	55	Spring	CBH2130
	56	Cord	CDE5960
	57	Connector	CKS3997
	58	Roller	CLA3583
	59	Frame	CNC8201
	60	Spacer	CNM6155
	61	Spacer	CNM6156
	62	Spacer	CNM6419
	63	PCB	CNP5321
	64	PCB	CNP5355
	65	Panel	CNS5247
	66	Lighting Conductor	CNV5605
	67	Cover	CNV5610
	68	Guide	CNV5672
	69	Guide	CNV5696
	70	Rack	CNV5697
	71	Gear	CNV5698
	72	Gear	CNV5761
	73	Torque Limiter Unit	CNV5762
	74	Holder	CNV5763
	75	Switch(S952)	CSN1022
	76	Switch(S951)	CSN1012
	77	Arm Unit	CXB3574
	78	Frame Unit	CXB3575
	79	Holder Unit	CXB3576
	80	Bracket Unit	CXB3577
	81	Arm Unit	CXB3866
	82	Motor(M951)	CXM1085
	83	Remote Control Assy	CZX3231
	84	Cover	CZN6410
	85	Case Assy	CXB3520
	86	Detach Grille Assy	CXB3979
	87	Screw	BPZ20P060FMC
	88	Screw	BPZ20P080FZK
	89	Button(⏏)	CAC5890
	90	Button(D)	CAC5891

Mark	No.	Description	Part No.
	91	Button(SOURCE)	CAC5892
	92	Button(◁▷)	CAC5893
	93	Button(EQ)	CAC5894
	94	Button(1-6)	CAC5896
	95	Housing	CNV5606
	96	Keyboard Unit	CWM6225
	97	Connector(CN1902)	CKS3995
	98	Connector(CN1901)	CKS3996
*	99	PCB	CNP5508
	100	OEL Module	MXK8002
	101	Grille Unit	CXB3983
	102	Cover Unit	CXB4309
	103	CD Mechanism Module(S8)	CXK5251
	104	Washer	2-1816-0035-D2-00
	105	Washer	2-1821-0045-D2-00

2.3 CD MECHANISM MODULE

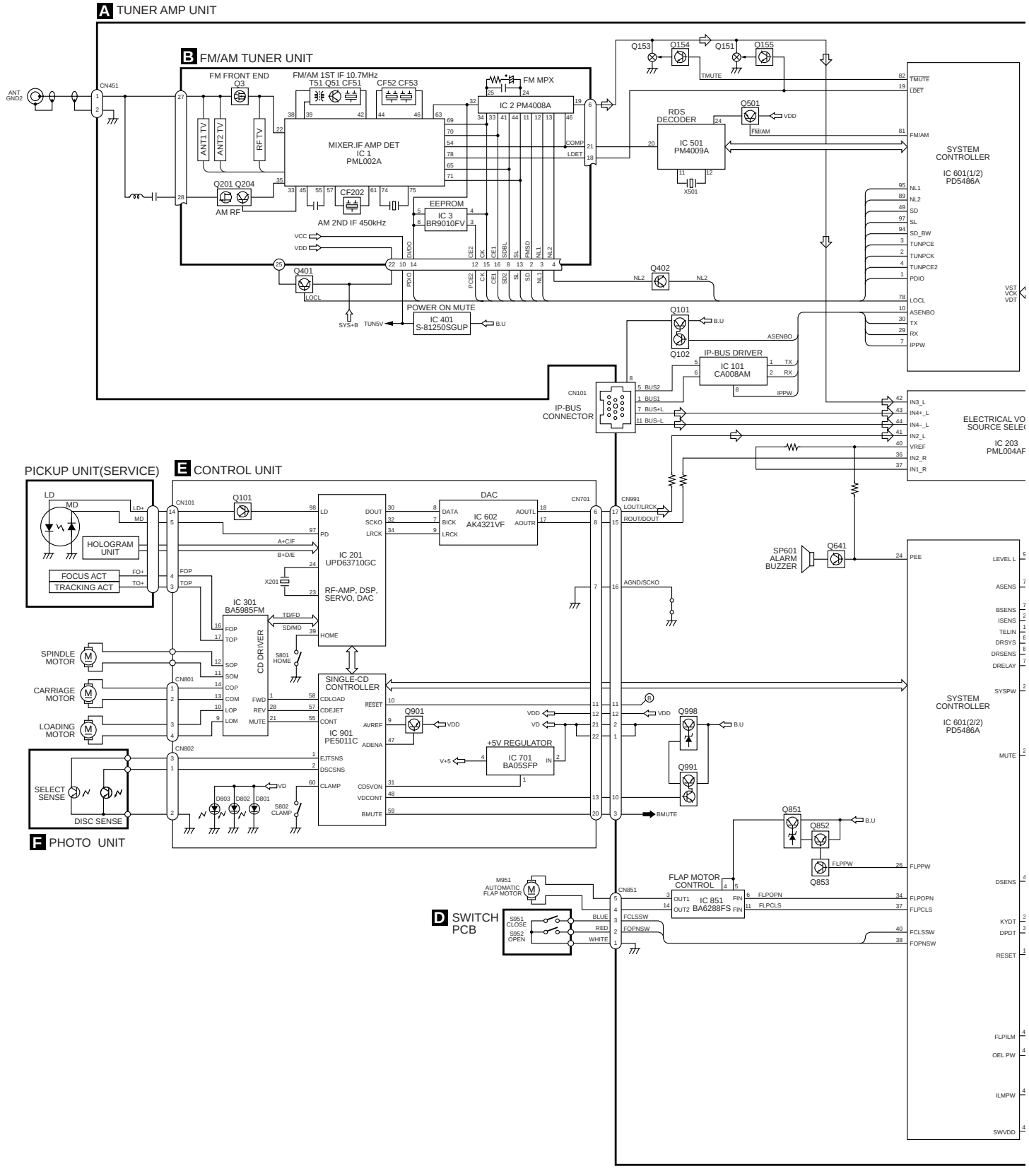


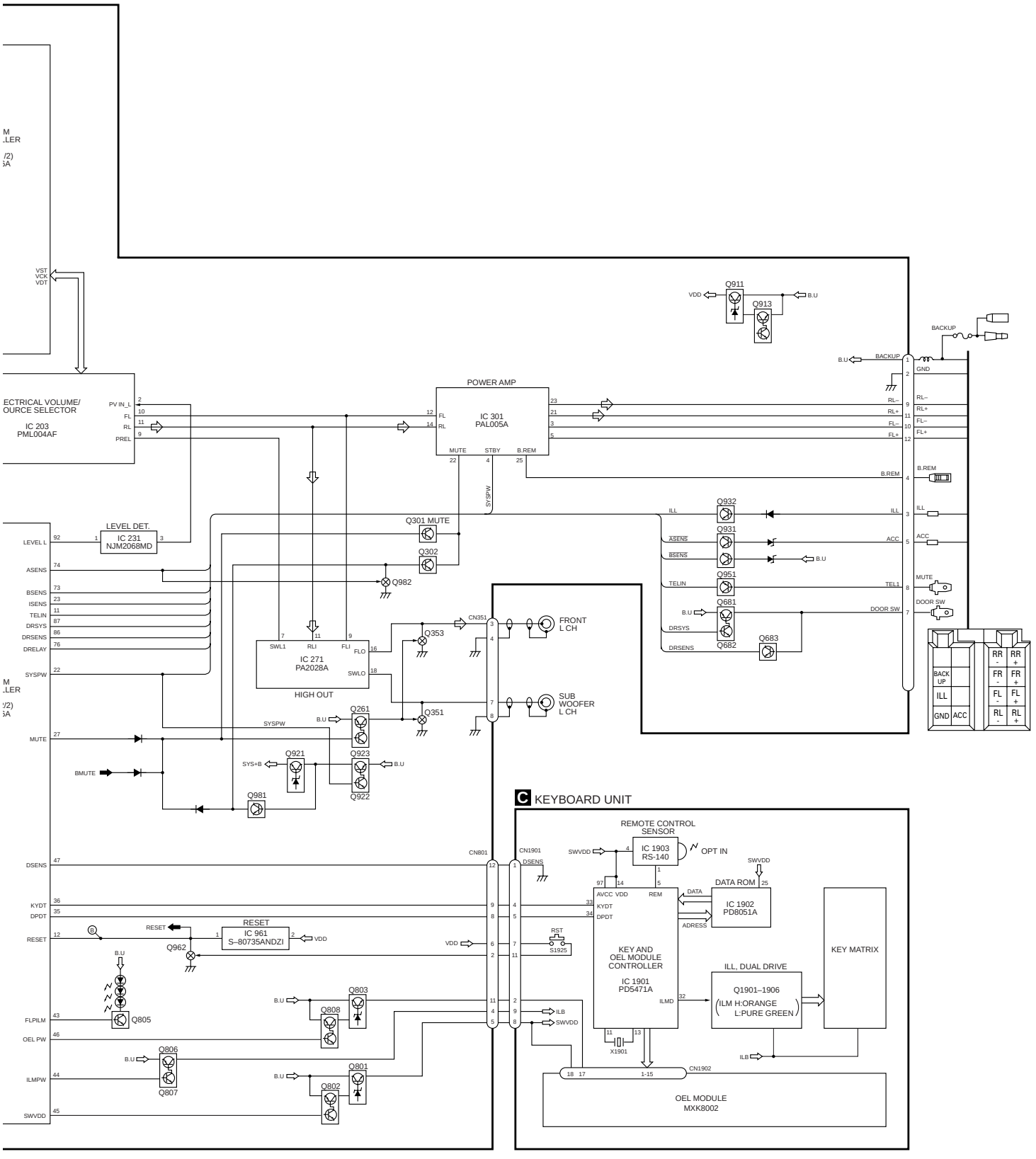
● CD MECHANISM MODULE SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Control Unit	CWX2358
	2	Connector(CN802)	CKS2192
	3	Connector(CN801)	CKS2193
	4	Connector(CN701)	CKS2771
	5	Connector(CN101)	CKS3486
	6	Screw	BMZ20P030FZK
	7	Screw	BSZ20P040FZK
	8	Screw(M2×3)	CBA1077
	9	Screw(M2×6)	CBA1489
	10	Screw	CBA1243
	11	Screw(M2×4)	CBA1362
	12	Washer	CBF1037
	13	Washer	CBF1038
	14	Washer	CBF1060
*	15	Washer	CBF1075
	16	Spring	CBH2079
	17	Spring	CBH2117
	18	Spring	CBH2278
	19	Spring	CBH2110
	20	Spring	CBH2282
	21	Spring	CBH2114
	22	Spring	CBH2115
	23	Spring	CBH2080
	24	Spring	CBH2118
	25	Spring	CBH2161
	26	Spring	CBH2163
	27	Spring	CBH2189
	28	Spring	CBH2249
	29	Spring	CBH2260
	30	Spring	CBH2262
	31	Spring	CBL1367
	32	Spring	CBL1369
	33	Connector	CDE5531
	34	Connector	CDE5532
	35	Shaft	CLA3304
	36	Screw(M2.6×6)	CBA1458
	37	Frame	CNC7544
	38	Frame	CNC7545
	39	Lever	CNC7546
	40	Arm	CNC7739
	41	Bracket	CNC7798
	42	Plate	CNC8090
	43	Spacer	CNM3315
	44	Sheet	CNM6170
	45	Cushion	CNM6204
	46	Sheet	CNM6215
	47	Ball	CNR1189
	48	Belt	CNT1086
	49	Roller	CNV4509
	50	Arm	CNV5246
	51	Arm	CNV5247
	52	Arm	CNV5248
	53	Arm	CNV5249
	54	Guide	CNV5254
	55	Guide	CNV5255
	56	Gear	CNV5257
	57	Gear	CNV5256
	58	Guide	CNV5869
	59	Damper	CNV5266
	60	Arm	CNV5359
	61	Arm	CNV5360
	62	Arm	CNV5361
	63	Guide	CNV5509
	64	Guide	CNV5510
	65	Holder	CNV5578
	66	Guide	CNV5751
	67	Clamper	CNV5758
	68	Gear	CNV5813
	69	Motor Unit(M1)	CXB2190
	70	Screw Unit	CXB2191
	71	Chassis Unit	CXB2192
	72	Gear Unit	CXB2193
	73	Arm Unit	CXB2194
	74	Motor Unit(M2)	CXB2195
	75	Lever Unit	CXB2553
	76	Arm Unit	CXB2554
	77	Motor Unit(M3)	CXB2562
	78	Arm Unit	CXB2795
	79	Bracket Unit	CXB4071
	80	Screw	JFZ20P025FMC
	81	Screw	JGZ17P025FZK
	82	Washer	YE15FUC
	83	Pickup Unit(Service)(P8)	CXX1285
	84	Screw	IMS26P030FMC
*	85	PCB	CNX2982
	86	Photo-transistor(Q1, 2)	CPT230SX-TU

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

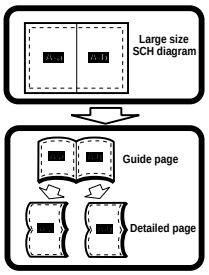
3.1 BLOCK DIAGRAM




POWER AMP
IC 301
PAL005A
IC 203
PML004AF
LEVEL DET.
IC 231
NJM2068MD
IC 271
PA2028A
HIGH OUT
Q301 MUTE
Q302
Q982
Q353
Q351
Q261
Q921
Q923
Q922
Q981
Q911
Q913
Q932
Q931
Q951
Q681
Q682
Q683
FRONT L CH
SUB WOOFER L CH
BACKUP
B.REM
ILL
ACC
MUTE
DOOR SW
C KEYBOARD UNIT
REMOTE CONTROL SENSOR
IC 1903
RS-140
OPT IN
DATA ROM
IC 1902
PD8051A
KEY AND
OEL MODULE
CONTROLLER
IC 1901
PD5471A
KEY MATRIX
ILL, DUAL DRIVE
Q1901–1906
(ILM H:ORANGE
L:PURE GREEN)
RESET
IC 961
S–80735ANDZI
Q962
S1925
Q805
Q808
Q803
Q807
Q806
Q802
Q801
X1901
OEL MODULE
MXK8002

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".



A-a

CD,TUNER,IP-BUS SIGNAL
TUNER SIGNAL
IP-BUS SIGNAL
CD SIGNAL

E F CD MECHANISM MODULE

IP-BUS

IP-BUS DRIVER

CD MECHANISM

B FM/AM TUNER UNIT

TUNER

FM(100%):-15.5dBs
AM(30%):-26dBs

RDS DECODER

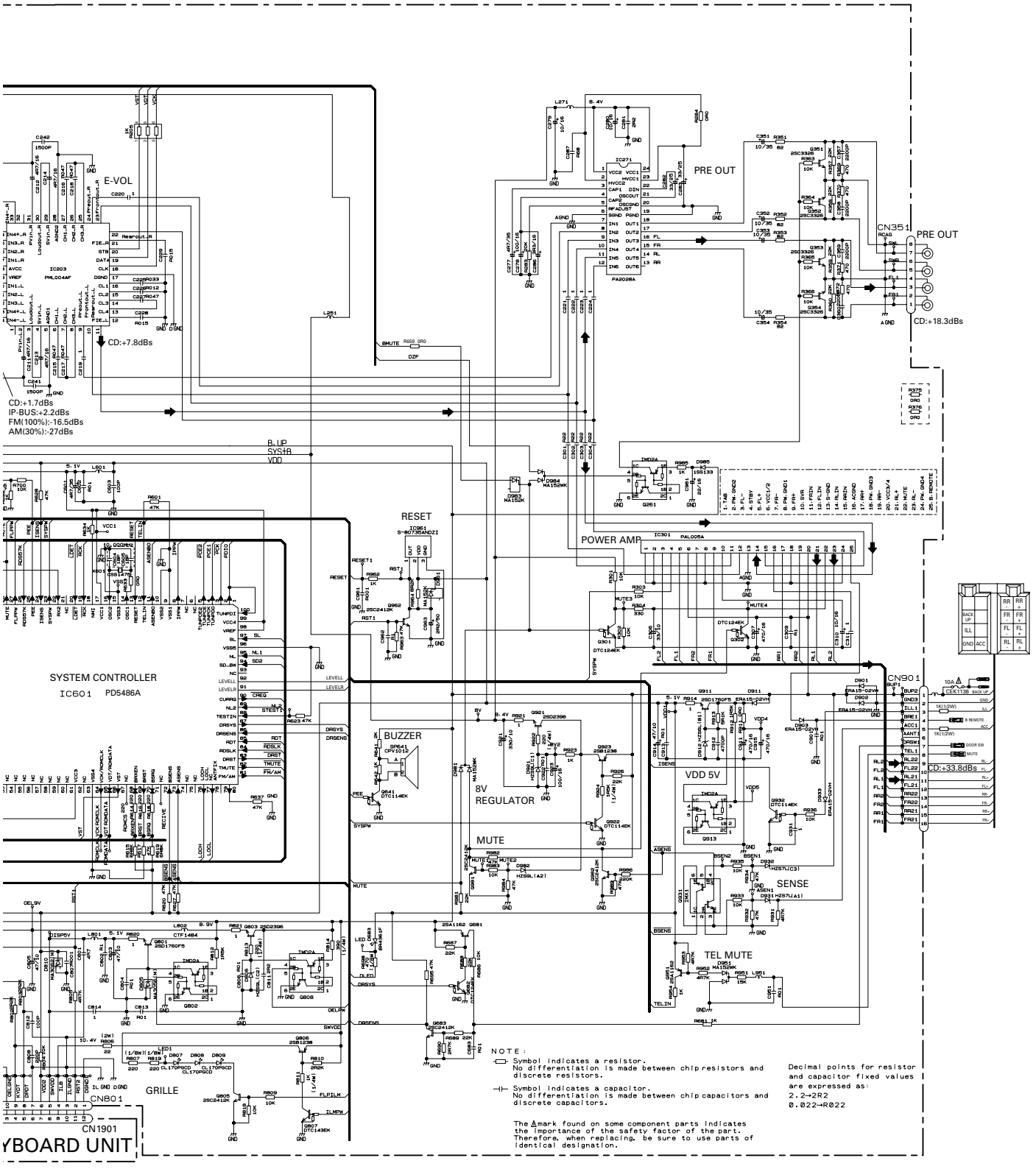
MOTOR DRIVE

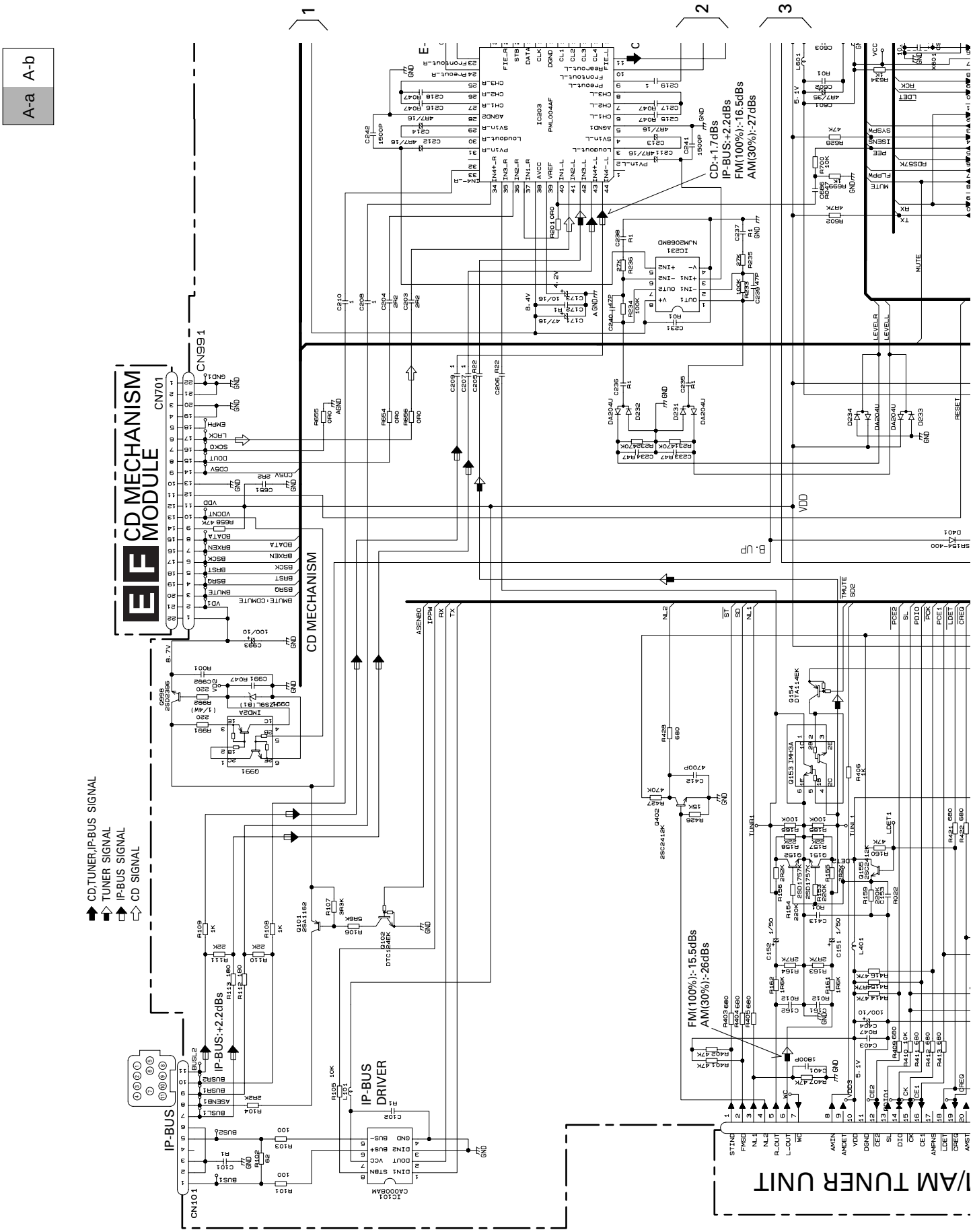
C KEY

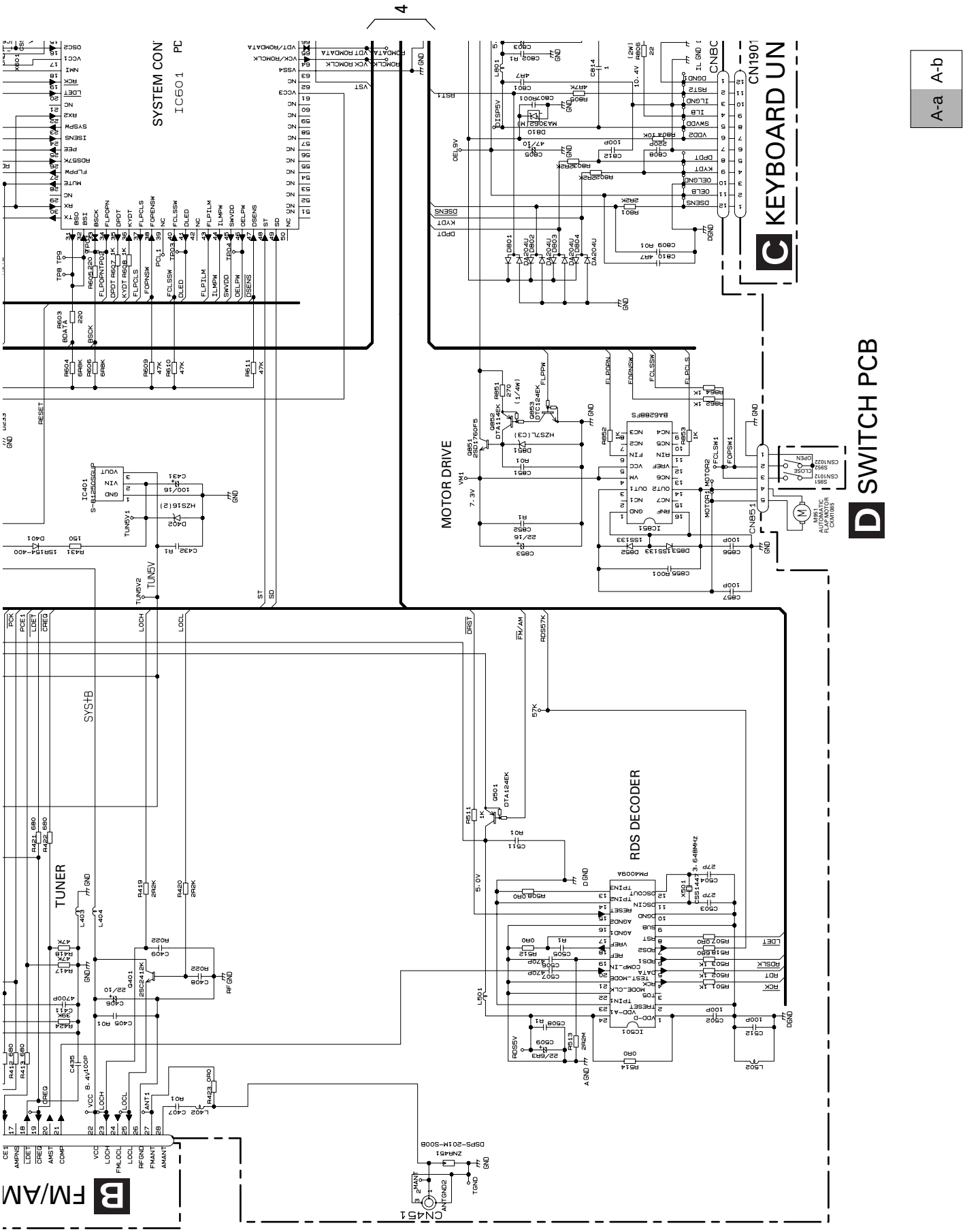
D SWITCH PCB

A-b

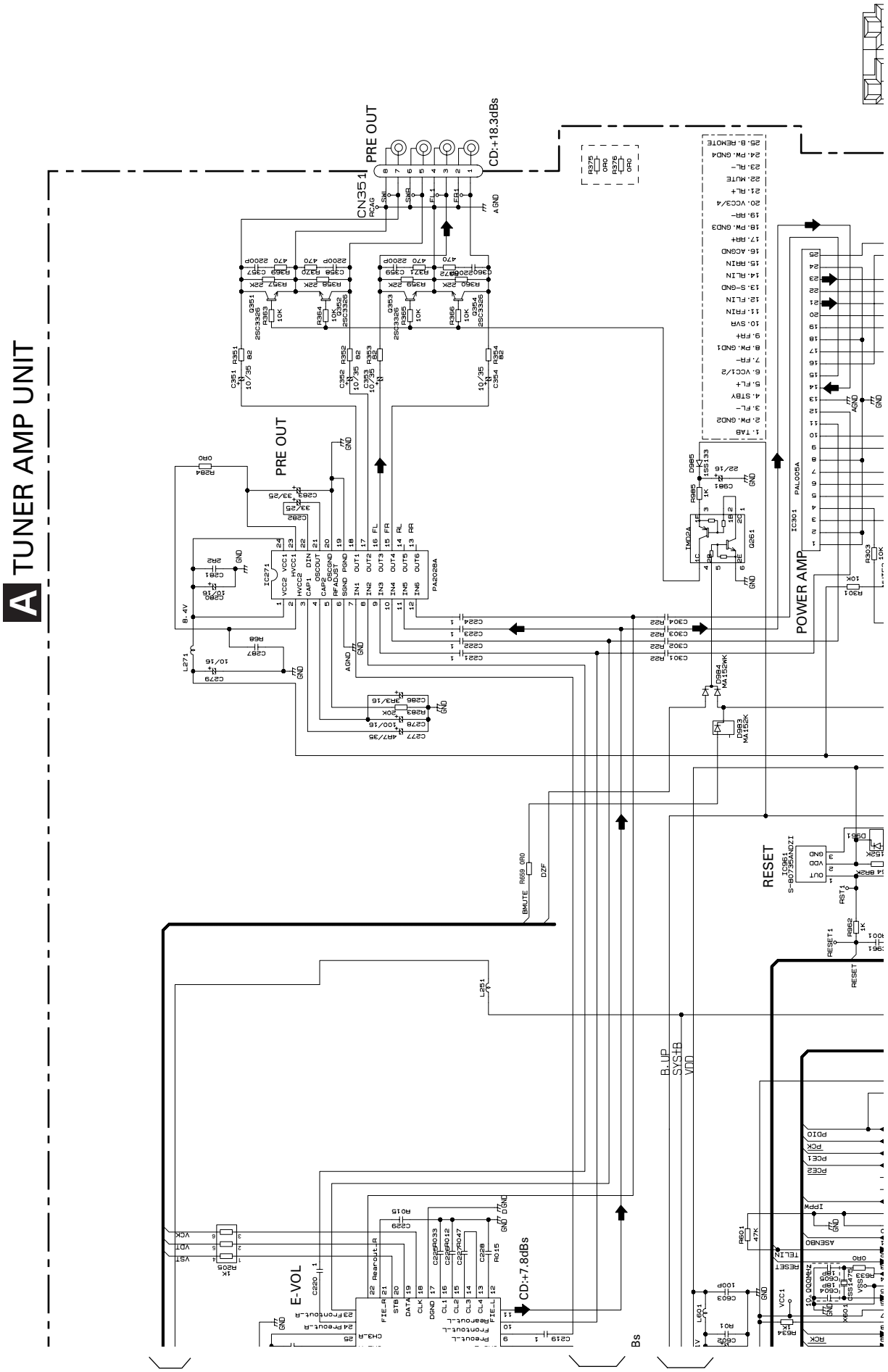
A TUNER AMP UNIT

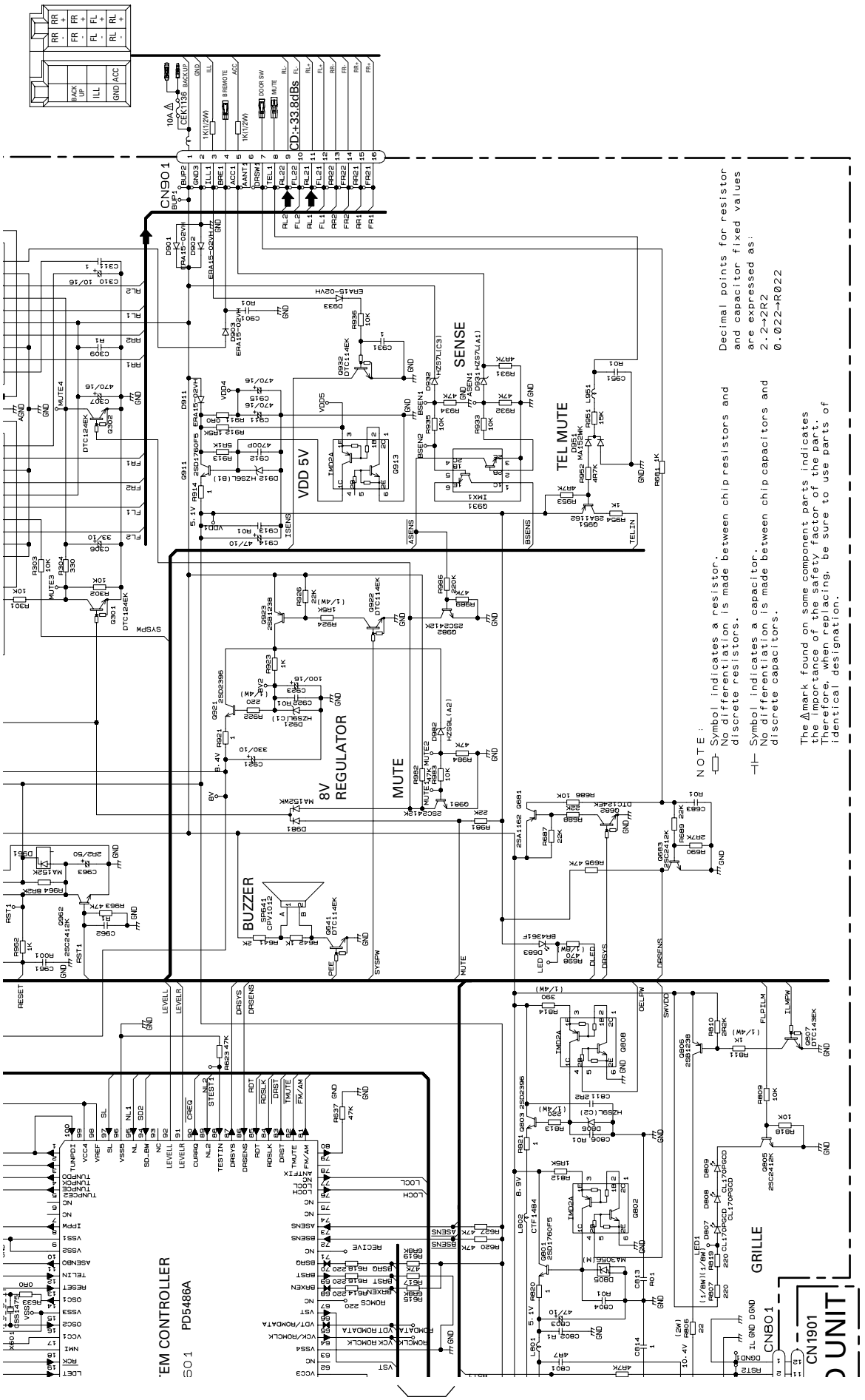



A-b
A-a
CD MECHANISM MODULE
CN701
CN991
CD MECHANISM
CD,TUNER,IP-BUS SIGNAL
TUNER SIGNAL
IP-BUS SIGNAL
CD SIGNAL
IP-BUS
IP-BUS DRIVER
IP-BUS:+2.2dBs
CD:+1.7dBs
IP-BUS:+2.2dBs
FM(100%):-16.5dBs
AM(30%):-27dBs
FM(100%):-15.5dBs
AM(30%):-26dBs
I/AM TUNER UNIT
VDD
B.UP
MUTE
RESET

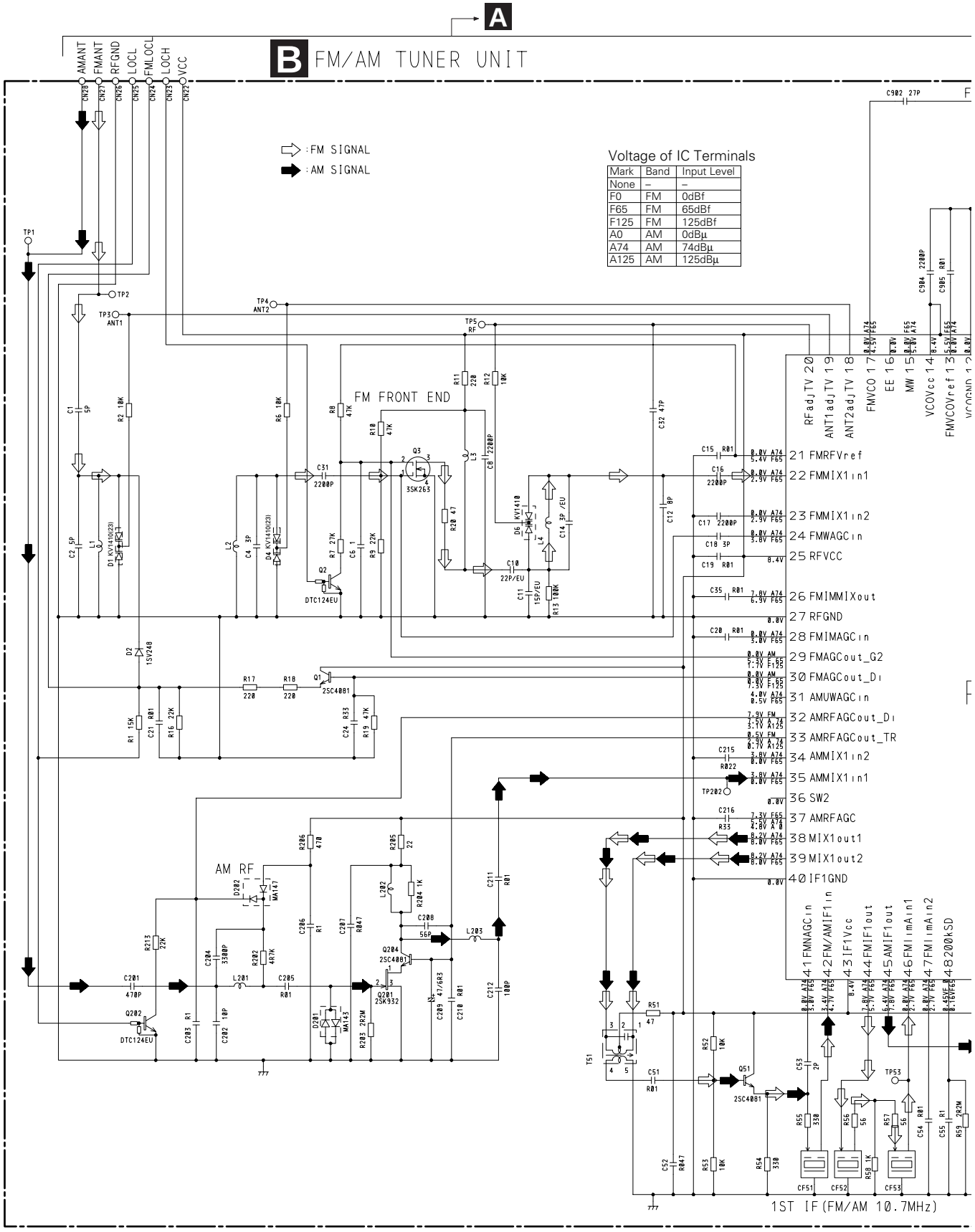

A-b
A-a
SYSTEM CON
IC601 PC
KEYBOARD UN
CN1901
CNBC
SWITCH PCB
MOTOR DRIVE
TUNER
SYSHB
RDS DECODER
FM/AM
CN451
CN851
MOTOR2
MOTOR1
FCLSW1
FOPSW1
TUNSV
TUNSV2
RESET
ST
SD
DRST
FM/AM
RDS57K
5.0V
8.4V
7.3V
AGND
DGND
GND
ANT1
ANT2
TGND
LOCH
LOCL
CREQ
LDET
PCK
PCE1
RFGND
FMANT
AMANT
VCC
FMLOCL
AMPNS
LOE
AMST
COMP
CE1

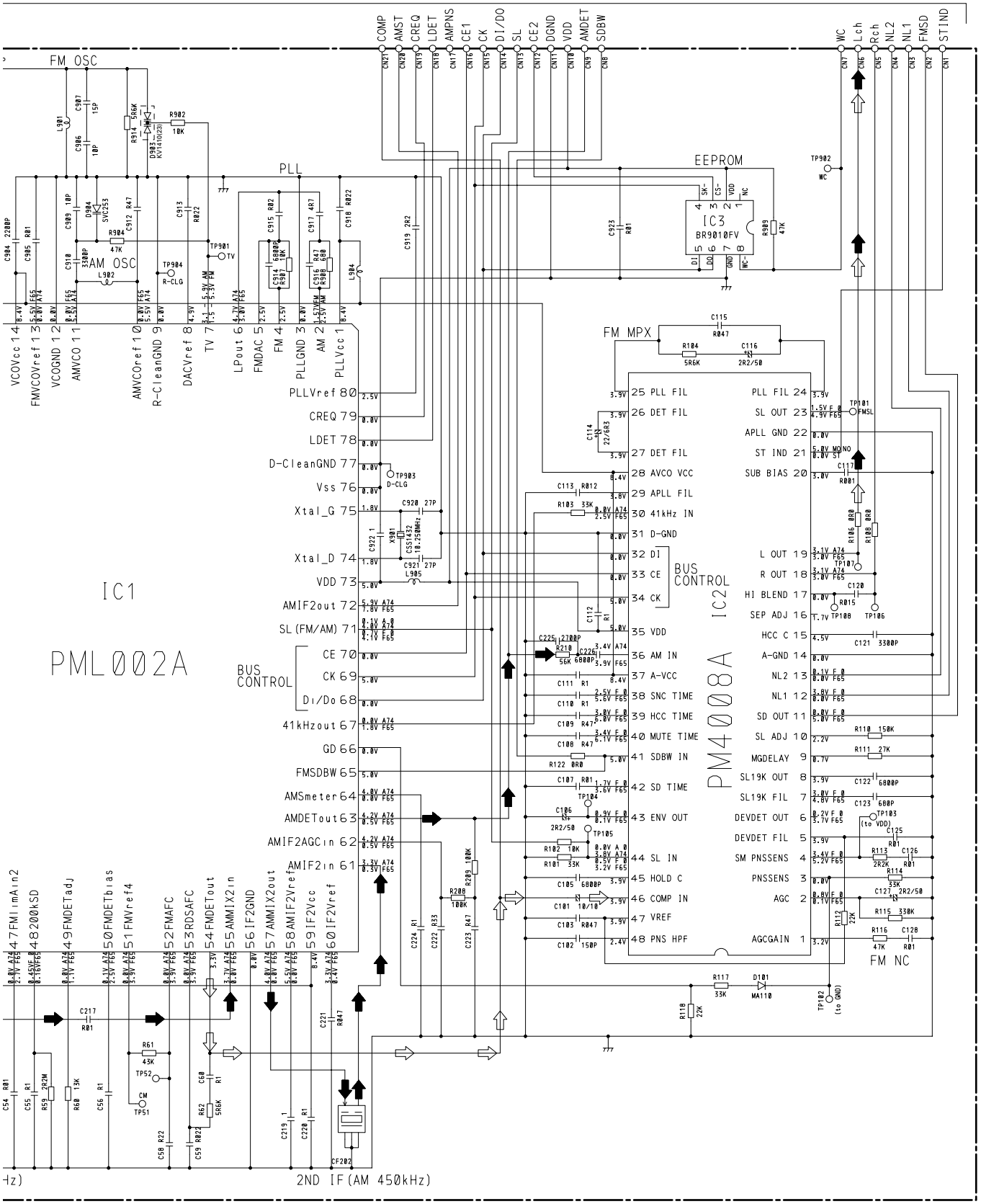
A-b
A-a


A TUNER AMP UNIT
PRE OUT
CD:+18.3dBs
CN351
PRE OUT
POWER AMP
RESET
E-VOL
CD:+7.8dBs
B_UP
SYSHB
VDD

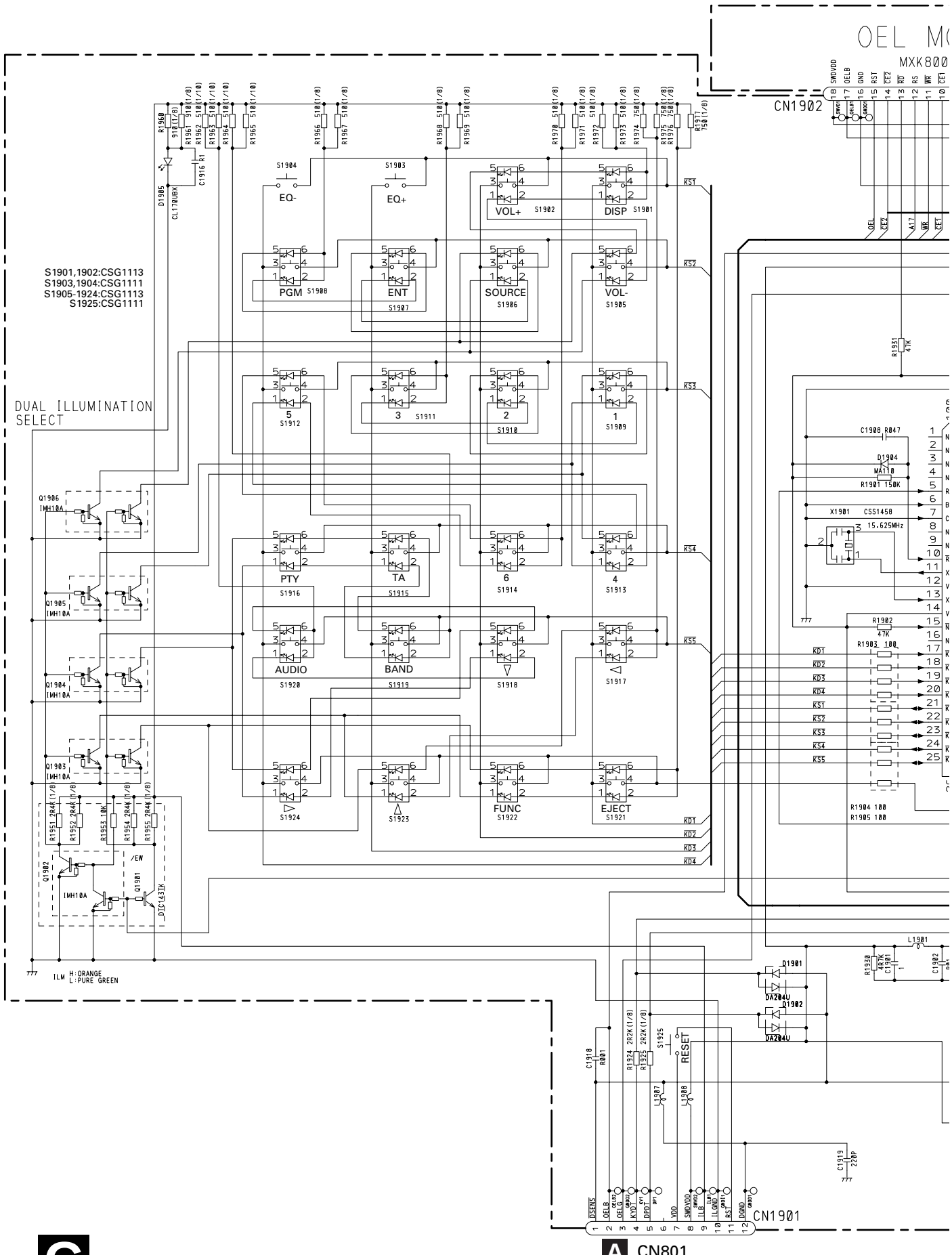

CN901
CD:+33.8dBs
SENSE
VDD 5V
TEL MUTE
8V REGULATOR
MUTE
BUZZER
GRILLE
CN1901
CN801
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.
The Δmark found on some component parts indicates the importance of the safety factor of the part.
Therefore, when replacing, be sure to use parts of identical designation.
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

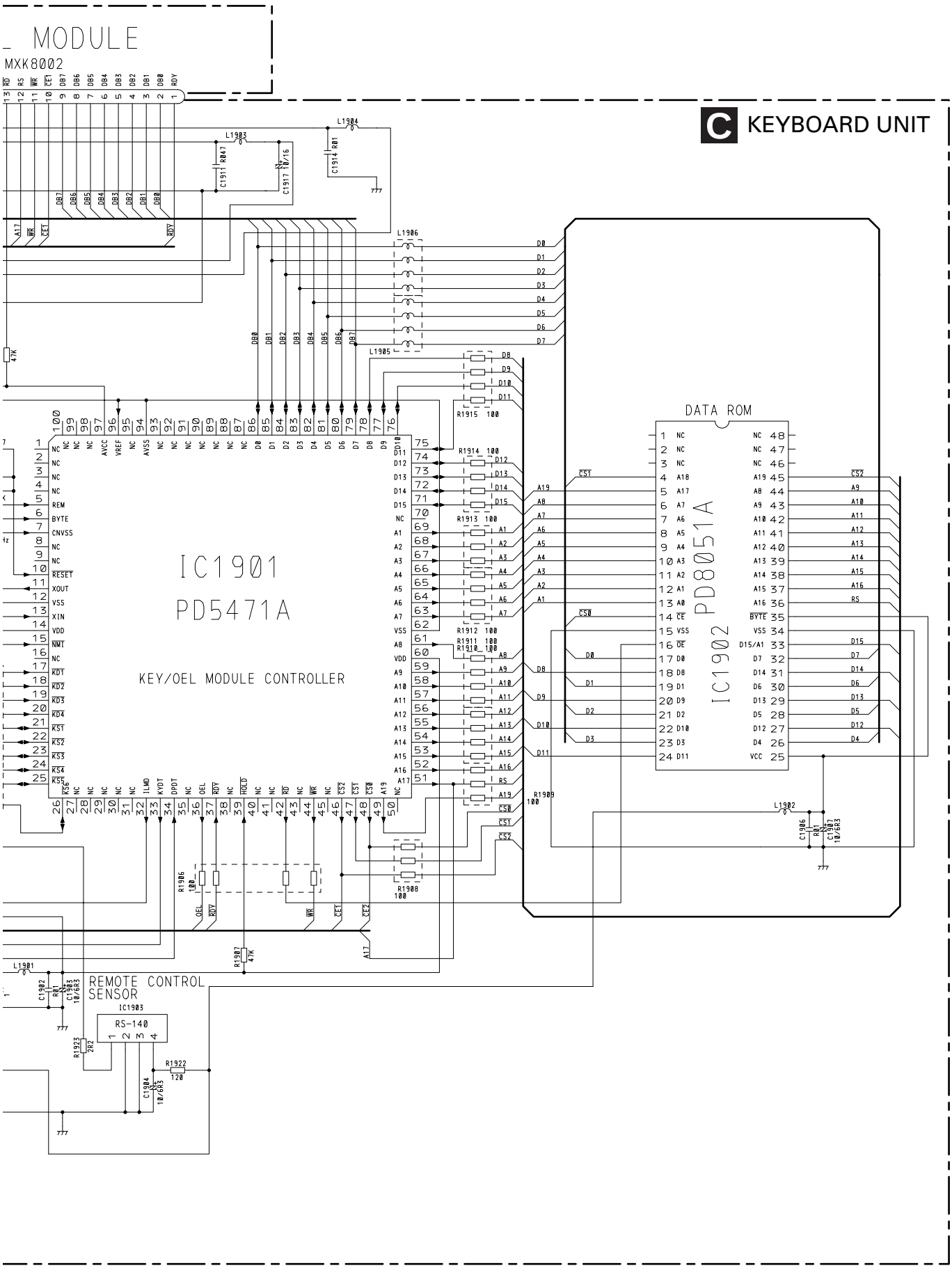
3.3 FM/AM TUNER UNIT



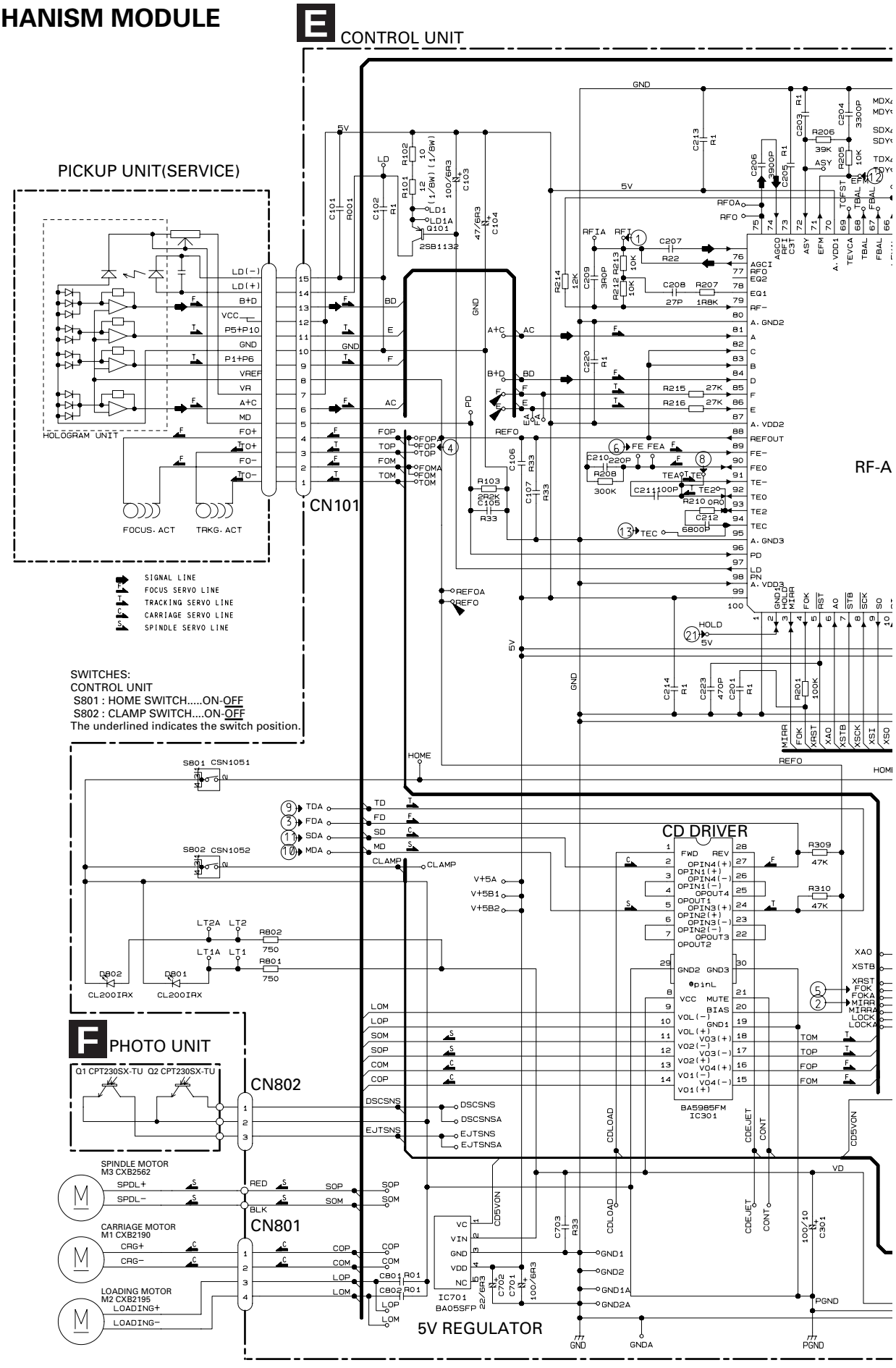

FM OSC
AM OSC
PLL
EEPROM
IC3
BR9010FV
FM MPX
IC1
PML002A
BUS CONTROL
IC2
PM4008A
BUS CONTROL
FM NC
2ND IF(AM 450kHz)
COMP
AMST
CREQ
LDET
AMPNS
CE1
CK
DI/DO
SL
CE2
DGND
VDD
AMDET
SDBW
WC
Lch
Rch
NL2
NL1
FMSD
STIND
VCOVcc 14
FMVCOVref 13
VCOGND 12
AMVCO 11
AMVCOref 10
R-CleanGND 9
DACVref 8
TV 7
LPout 6
FMDAC 5
FM 4
PLLGND 3
AM 2
PLLVcc 1
PLLVref 80
CREQ 79
LDET 78
D-CleanGND 77
Vss 76
Xtal_G 75
Xtal_D 74
VDD 73
AMIF2out 72
SL(FM/AM) 71
CE 70
CK 69
Di/Do 68
41kHzout 67
GD 66
FMSDBW 65
AMSmeter 64
AMDETout 63
AMIF2AGCin 62
AMIF2in 61
47FMIimAin2
48200kSD
49FMDETadj
50FMDETbias
51FMVref4
52FMAFC
53RDSAFC
54FMDETout
55AMMIX2in
56IF2GND
57AMMIX2out
58AMIF2Vref
59IF2Vcc
60IF2Vref
25 PLL FIL
26 DET FIL
27 DET FIL
28 AVCO VCC
29 APLL FIL
30 41kHz IN
31 D-GND
32 DI
33 CE
34 CK
35 VDD
36 AM IN
37 A-VCC
38 SNC TIME
39 HCC TIME
40 MUTE TIME
41 SDBW IN
42 SD TIME
43 ENV OUT
44 SL IN
45 HOLD C
46 COMP IN
47 VREF
48 PNS HPF
PLL FIL 24
SL OUT 23
APLL GND 22
ST IND 21
SUB BIAS 20
L OUT 19
R OUT 18
HI BLEND 17
SEP ADJ 16
HCC C 15
A-GND 14
NL2 13
NL1 12
SD OUT 11
SL ADJ 10
MGDELAY 9
SL19K OUT 8
SL19K FIL 7
DEVDET OUT 6
DEVDET FIL 5
SM PNSSENS 4
PNSSENS 3
AGC 2
AGCGAIN 1

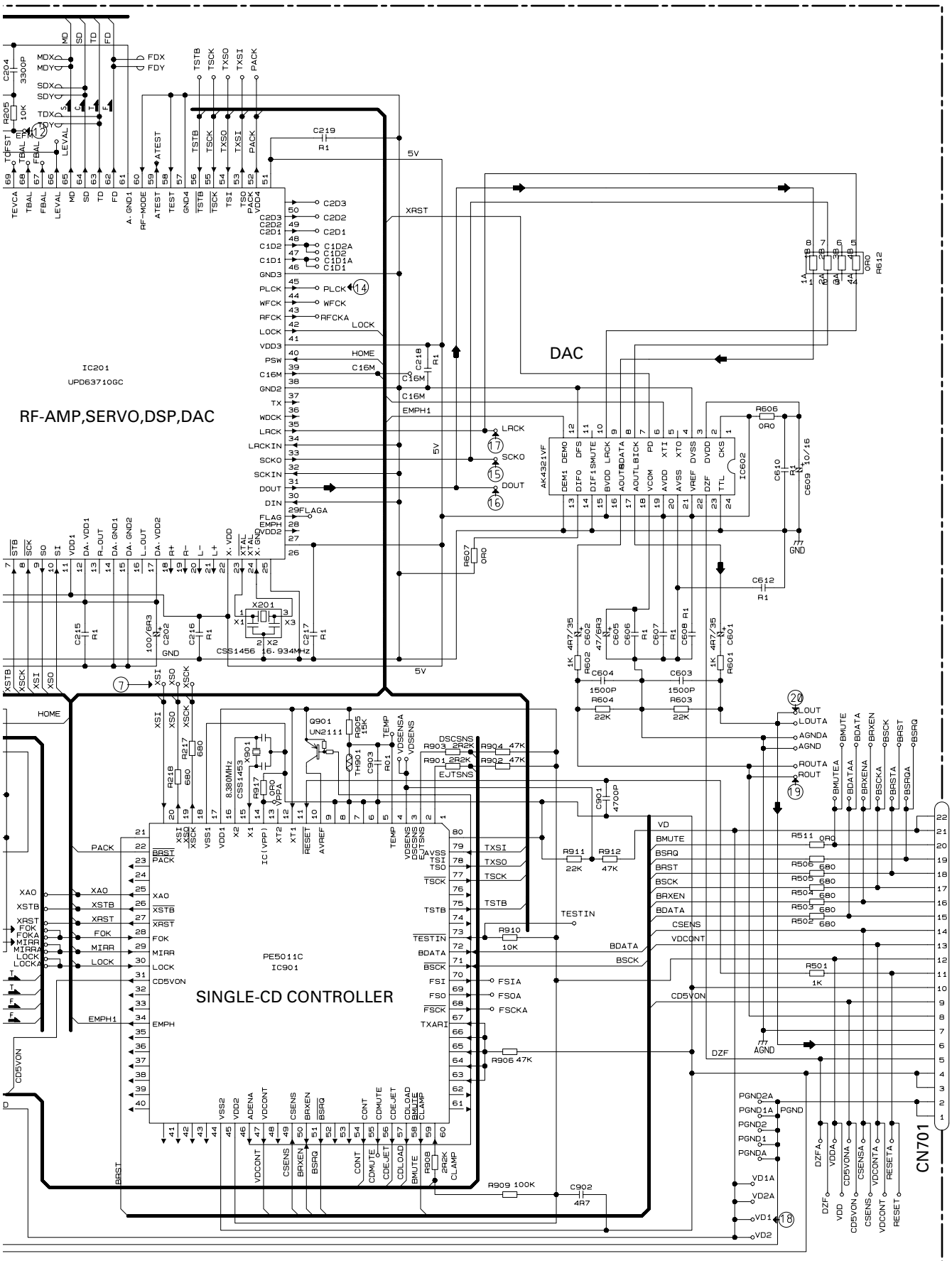
3.4 KEYBOARD UNIT




MODULE
MXK8002
C KEYBOARD UNIT
IC1901
PD5471A
KEY/OEL MODULE CONTROLLER
DATA ROM
IC1902
PD8051A
REMOTE CONTROL SENSOR
IC1903
RS-140

3.5 CD MECHANISM MODULE

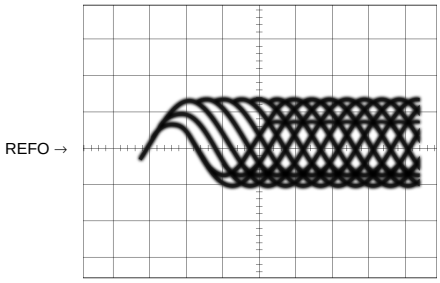



RF-AMP,SERVO,DSP,DAC
IC201
UPD63710GC
DAC
AK4321VF
IC602
SINGLE-CD CONTROLLER
PE5011C
IC901
CN701
CN991
X201
16.934MHz
X901
8.380MHz
Q901
UN2111
TH901
EJTSNS
TESTIN
CD5VON
EMPH1
LOCK
HOME
C16M
XRST
PACK
BRST
5V
GND
AGND
PGND
VD
BMUTE
BSRQ
BRST
BSCK
BRXEN
BDATA
CSENS
VDCONT
RESET
DZF

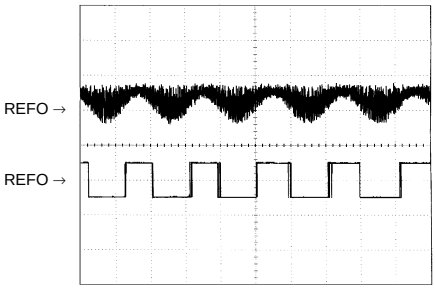
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO:2.5V

● Waveforms

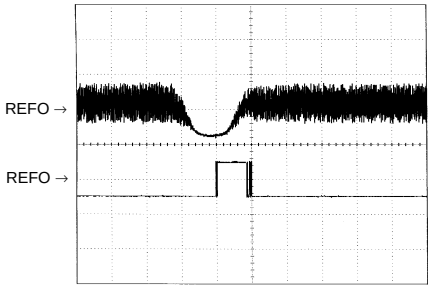
① RFI 0.5V/div. 0.5µs/div.
Normal mode: play



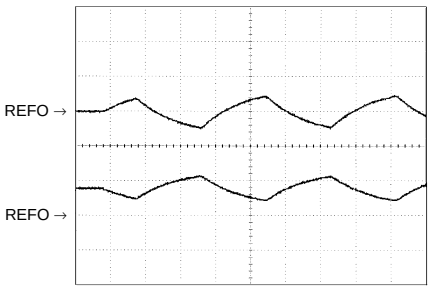
① CH1: RFI 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Test mode: Tracking open



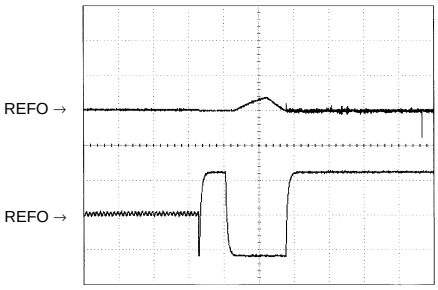
① CH1: RFI 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Normal mode: The defect part passes 800µm



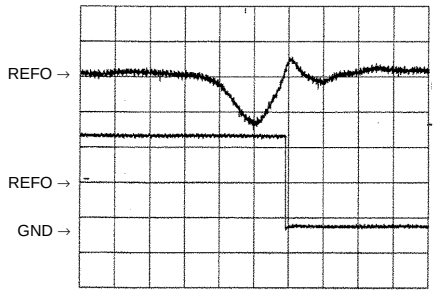
③ CH1: FD 0.5V/div. 0.2s/div.
④ CH2: FO+ 2V/div.
Test mode: No disc, Focus close



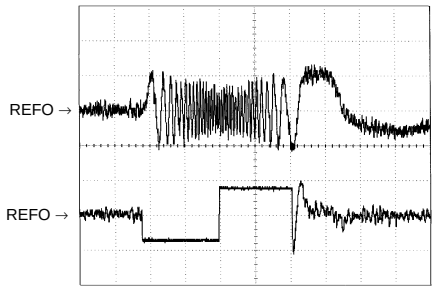
③ CH1: FD 0.5V/div. 0.2s/div.
⑤ CH2: FOK 2V/div.
Normal mode: Focus close



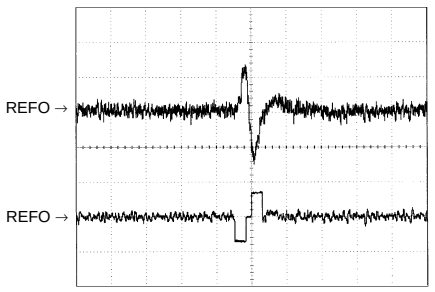
⑥ CH1: FE 0.5V/div. 1ms/div.
⑦ CH2: XSI 2V/div.
Normal mode: Focus close



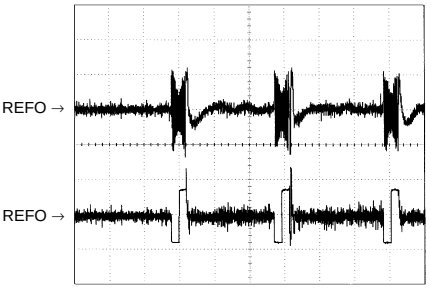
⑧ CH1: TE 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 32 tracks jump (REV)



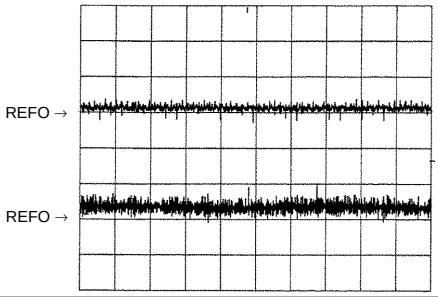
⑧ CH1: TE 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: Single jump (REV)



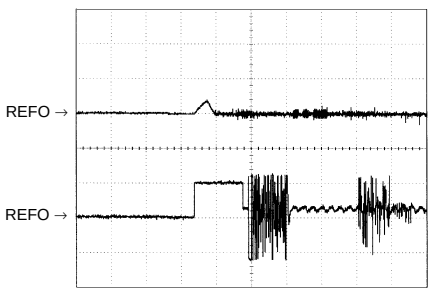
⑧ CH1: TE 0.5V/div. 5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 100 tracks jump (REV)



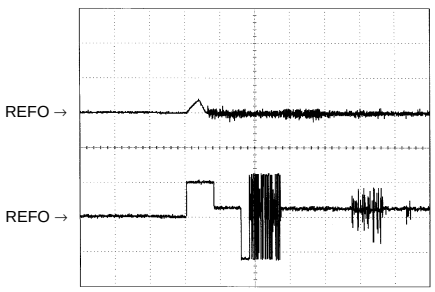
⑥ CH1: FE 0.1V/div. 20ms/div.
③ CH2: FD 0.2V/div.
Normal mode: Play



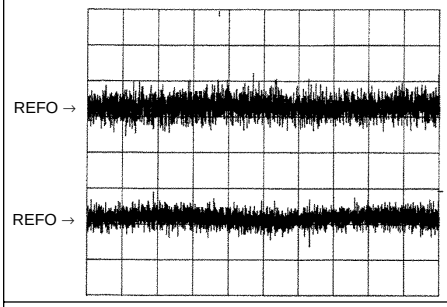
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MD 1V/div.
Normal mode: Focus close (12cm)



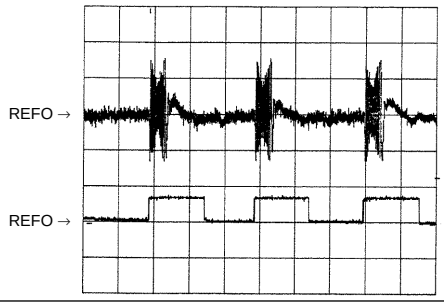
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MD 1V/div.
Normal mode: Focus close (8cm)



⑧ CH1: TE 0.2V/div. 20ms/div.
⑨ CH2: TD 0.2V/div.
Normal mode: play

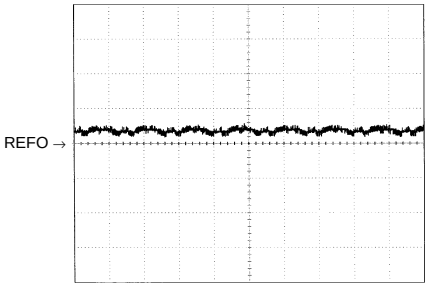


⑧ CH1: TE 0.5V/div. 5ms/div.
⑪ CH2: SD 0.5V/div.
TEST mode: 100 Tracks jump(FWD)

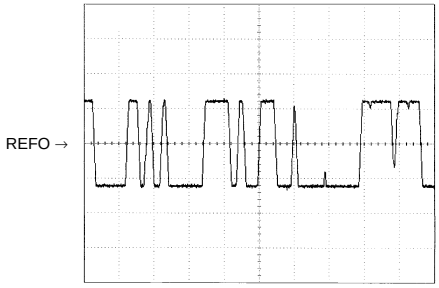


⑩ MD 0.5V/div. 0.1s/div.

Normal mode: Play (12cm)

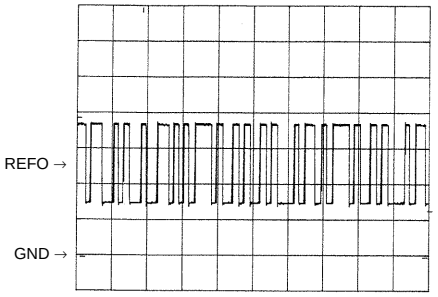


⑩ MD 1V/div. 10ms/div.
Normal mode:
Long Search (12cm)

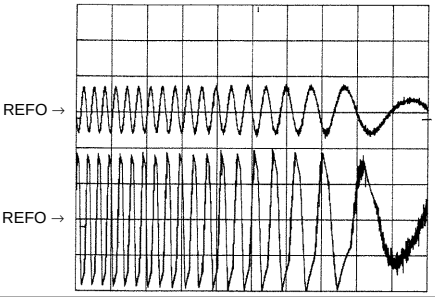


⑫ EFM 1V/div. 5µs/div.

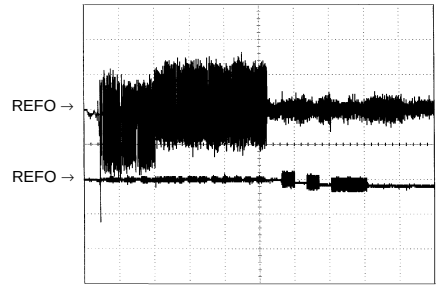
Normal mode: play



⑧ CH1: TE 1V/div. 2ms/div.
⑬ CH2: TEC 1V/div.
Test mode: Focus close
Tracking open

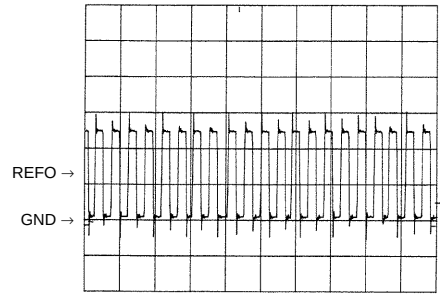


⑧ CH1: TE 0.5V/div. 0.2s/div.
⑥ CH2: FE 0.5V/div.
Normal mode: AGC after focus close



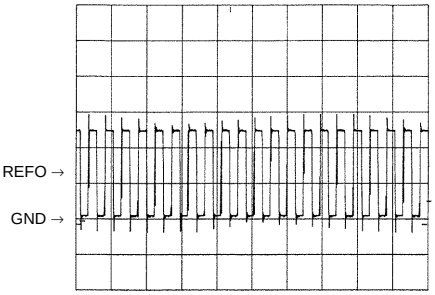
⑭ PLCK 2V/div. 0.5µs/div.

Normal mode: play



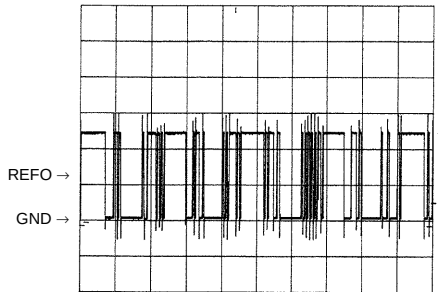
⑮ SCKO 2V/div. 1µs/div.

Normal mode: play



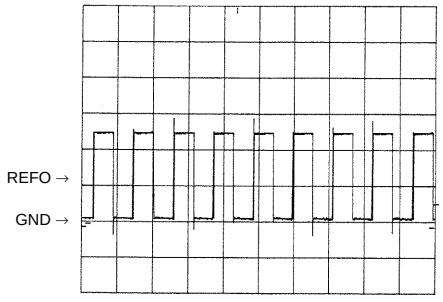
⑯ Dout 2V/div. 10µs/div.

Normal mode: play



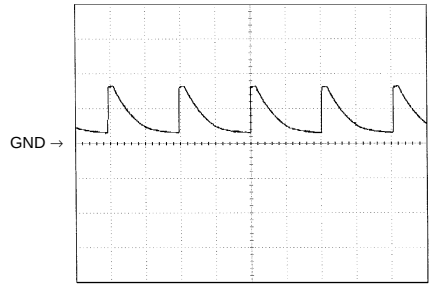
⑰ LRCK 2V/div. 20µs/div.

Normal mode: play

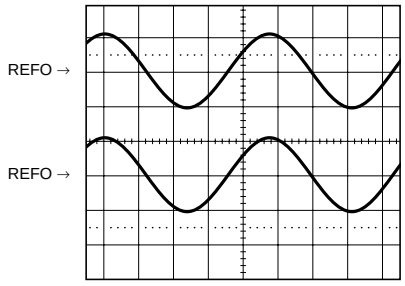


⑱ VD 5V/div. 50ms/div.

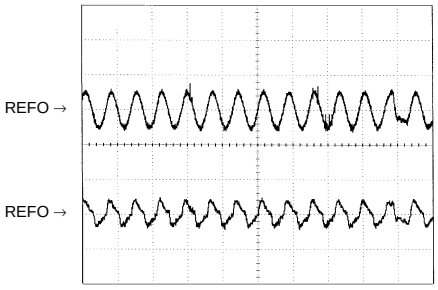
Normal mode: No disc



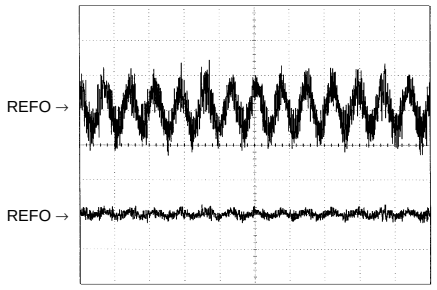
⑲ CH1: R OUT 1V/div. 0.2ms/div.
⑳ CH2: L OUT 1V/div.
Normal mode: Play (1kHz 0dB)



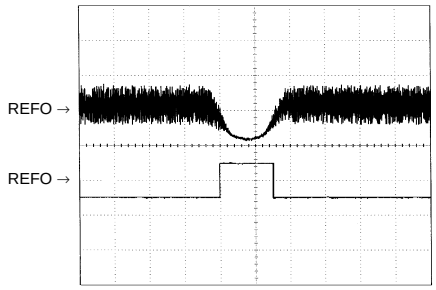
⑥ CH1: FE 0.2V/div. 1ms/div.
③ CH2: FD 0.5V/div.
Normal mode: During AGC



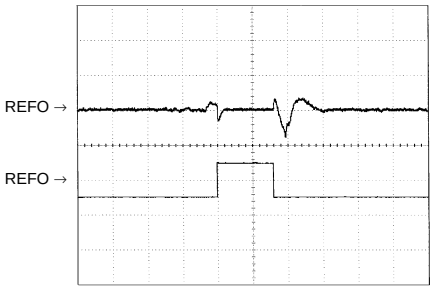
⑧ CH1: TE 0.2V/div. 1ms/div.
⑨ CH2: TD 0.5V/div.
Normal mode: During AGC



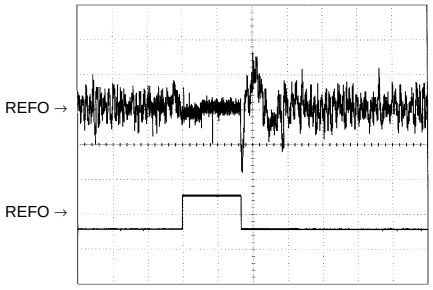
① CH1: RFI 1V/div. 0.5ms/div.
㉑ CH2: HOLD 5V/div.
Normal mode: The defect part passes 800µm(B.D)



③ CH1: FD 1V/div. 0.5ms/div.
㉑ CH2: HOLD 5V/div.
Normal mode: The defect part passes 800µm(B.D)



⑨ CH1: TD 0.1V/div. 0.5ms/div.
㉑ CH2: HOLD 5V/div.
Normal mode: The defect part passes 800µm(B.D)

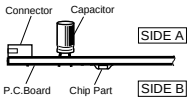


4. PCB CONNECTION DIAGRAM

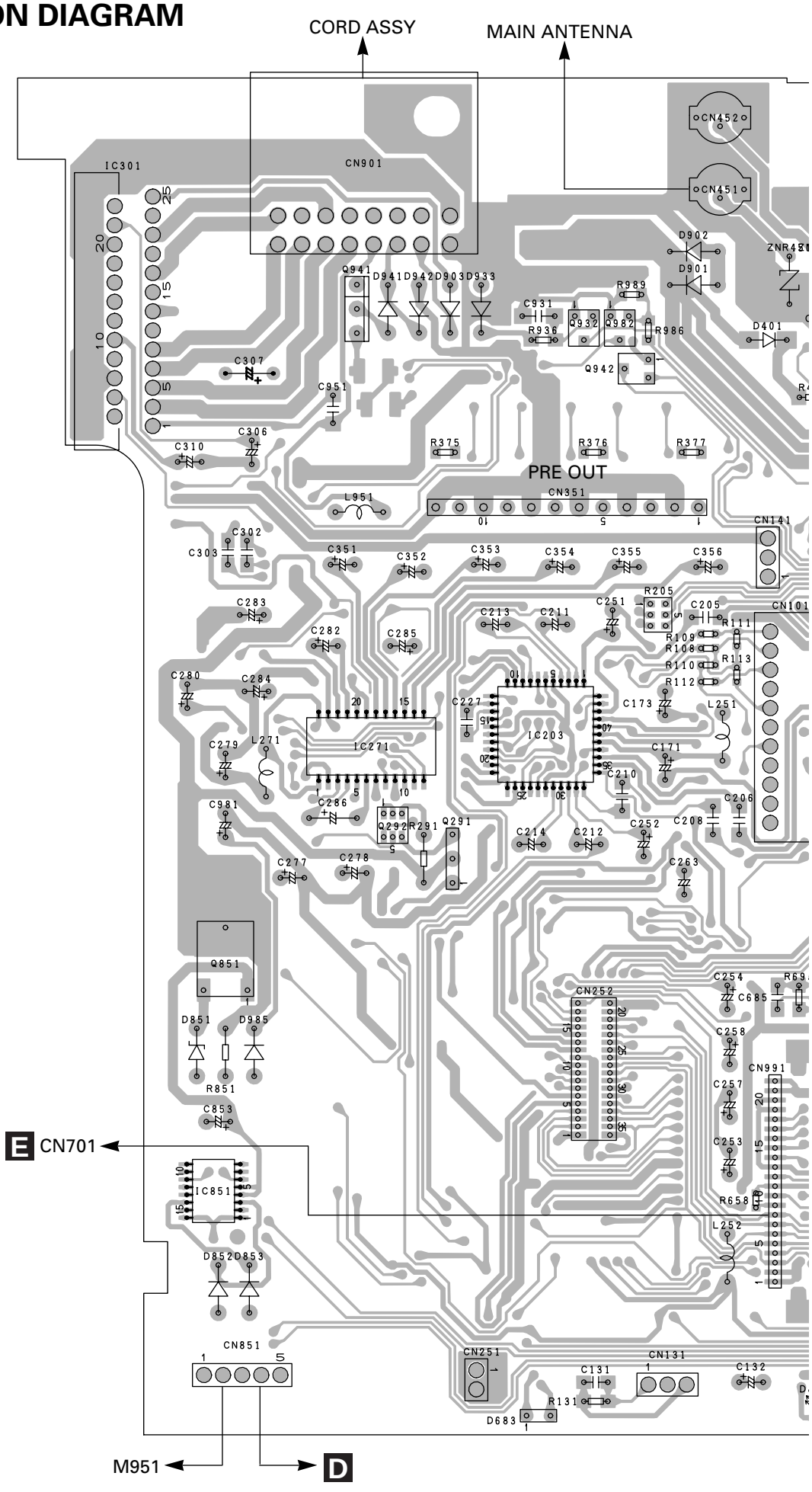
4.1 TUNER AMP UNIT

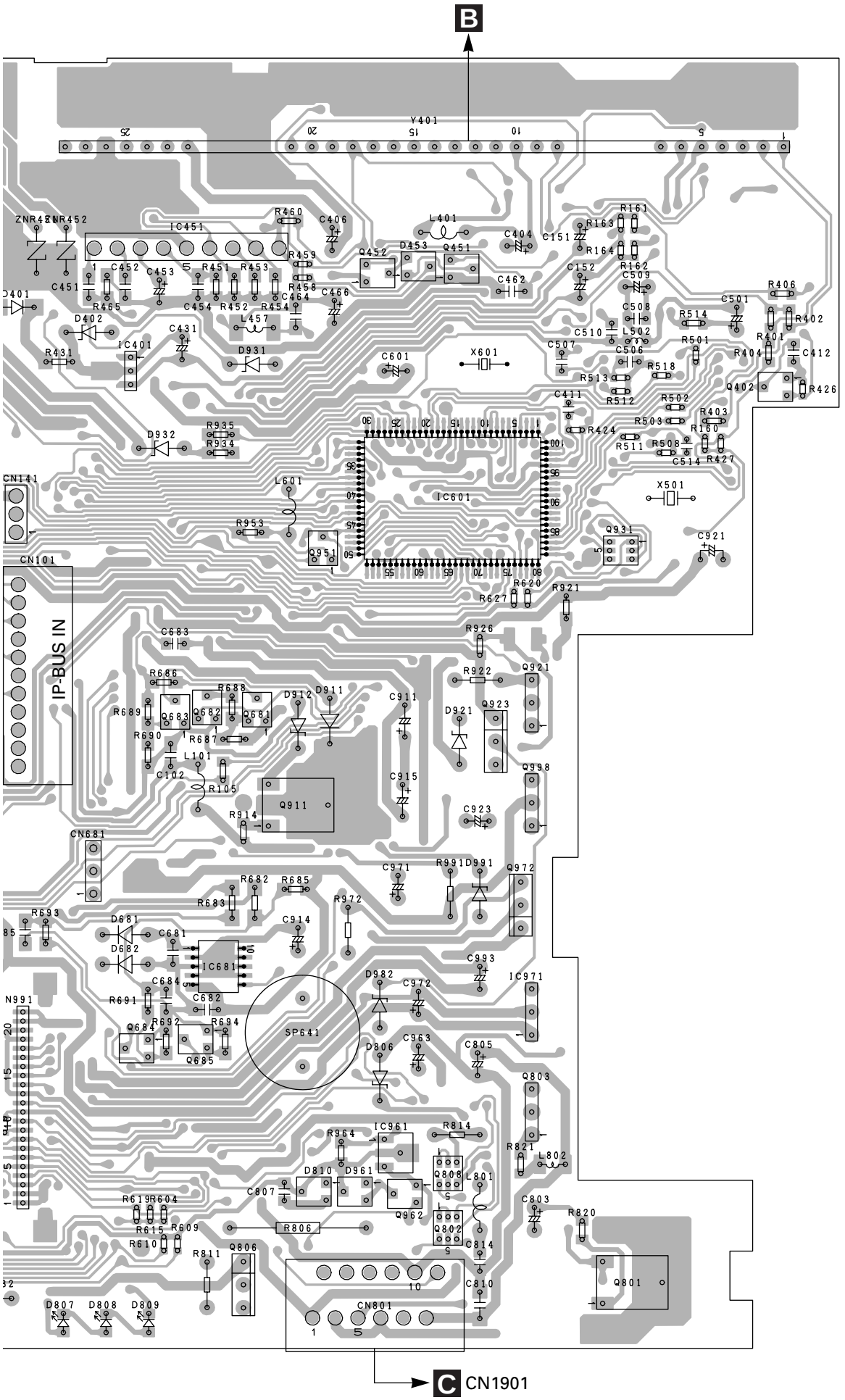
NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



A TUNER AMP UNIT





SIDE A

A

IC301

IC451

Q941 Q451 Q452

Q932 Q982

Q942

IC401

Q402

B

IC601

Q931

Q951

Q921

IC203 IC271

Q923 Q682 Q681 Q683

Q291 Q998 Q292

Q911

C

Q972

Q851

IC681

IC971

Q684

Q685

Q803

IC851

IC961

Q808

D

Q962

Q802

Q806

Q801

A TUNER AMP UNIT

Q401
IC591
Q153 Q155
Q152 Q151
Q154
Q453
Q454
Q302
IC501
Q351 Q301
Q356 Q355 Q354 Q353 Q352
Q501
Q101
Q922
Q102
IC101
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Q991
Q971
Q853
Q981 Q261
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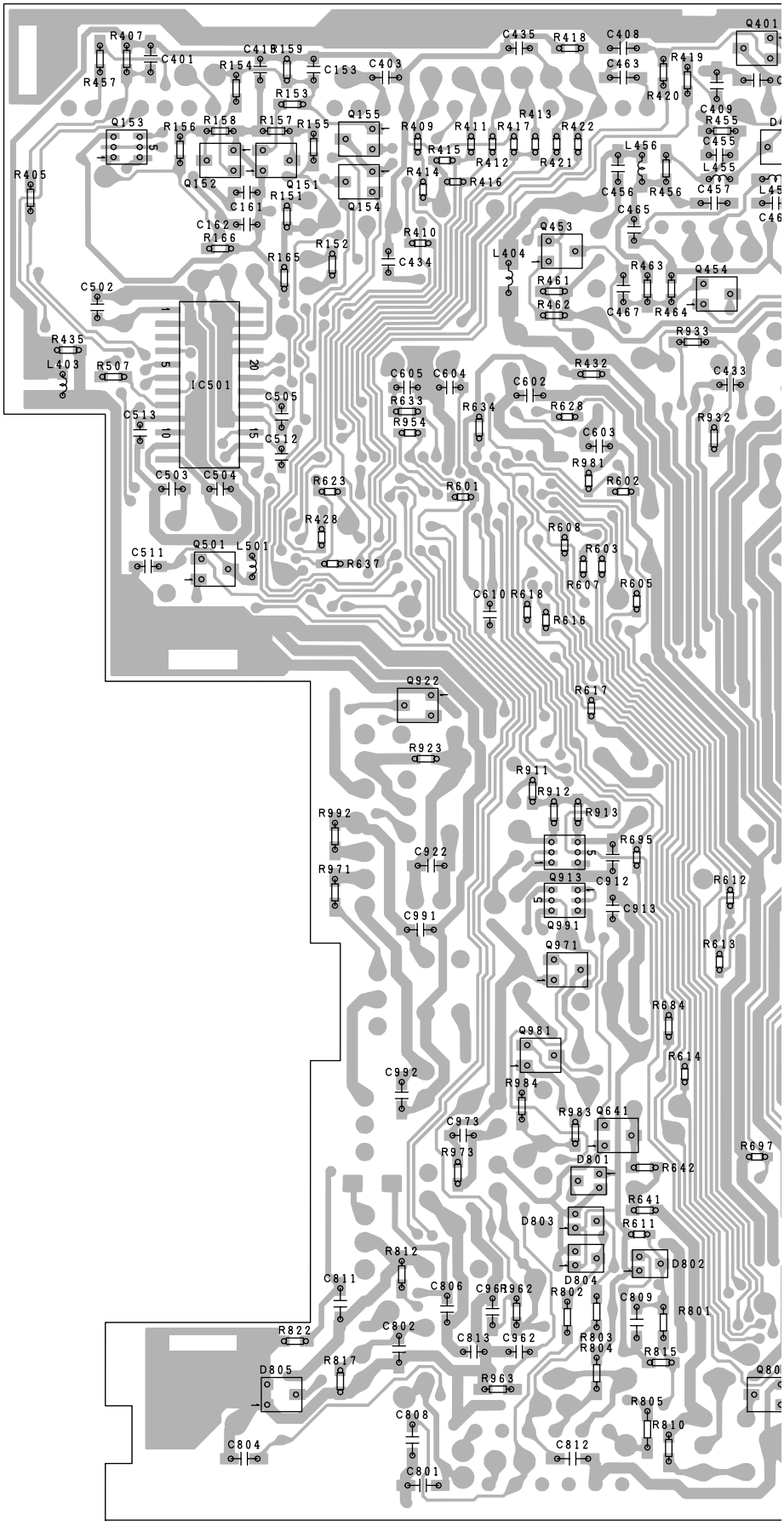
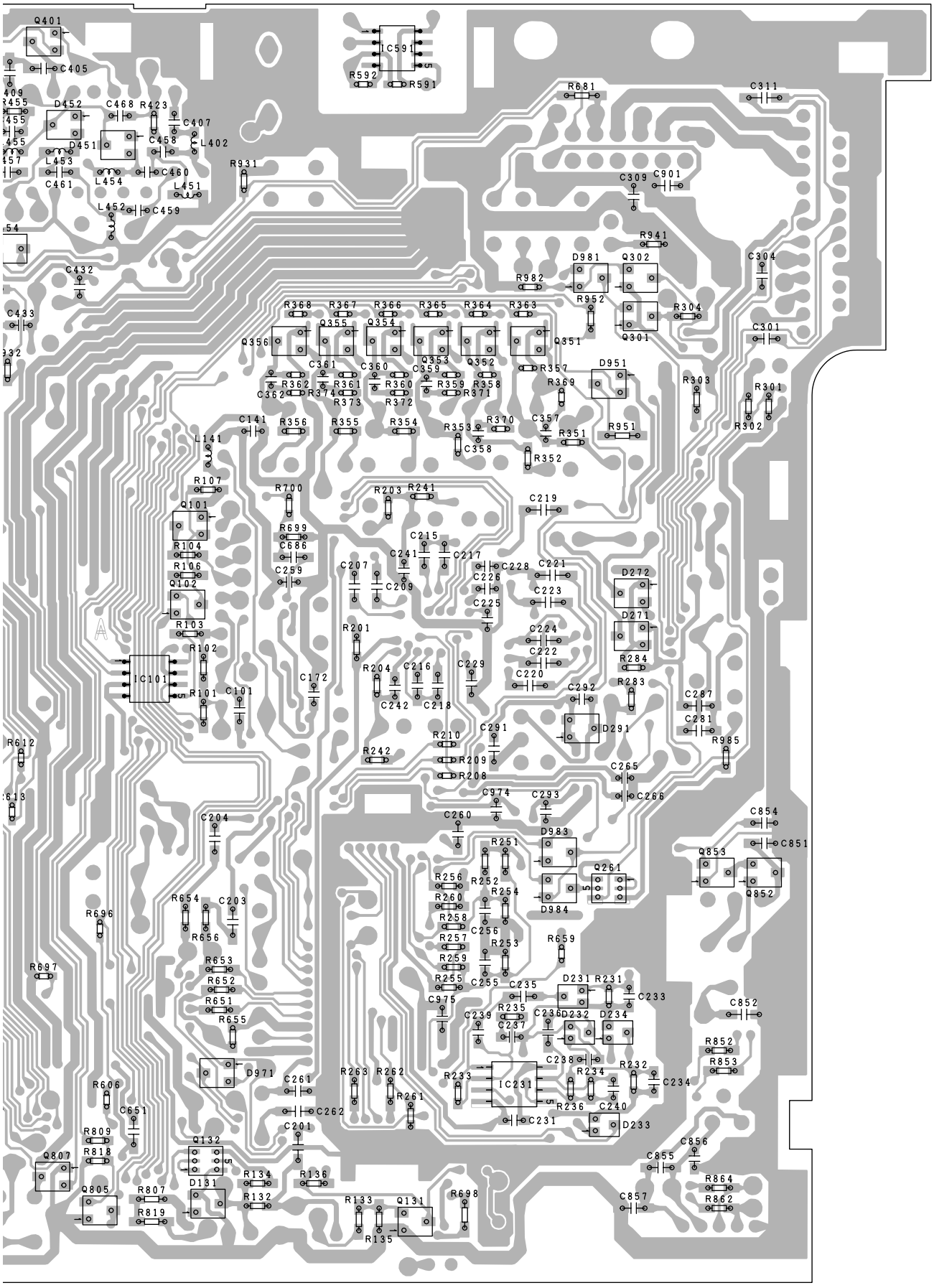
Q641
IC231
Q132
Q807
Q805
Q131

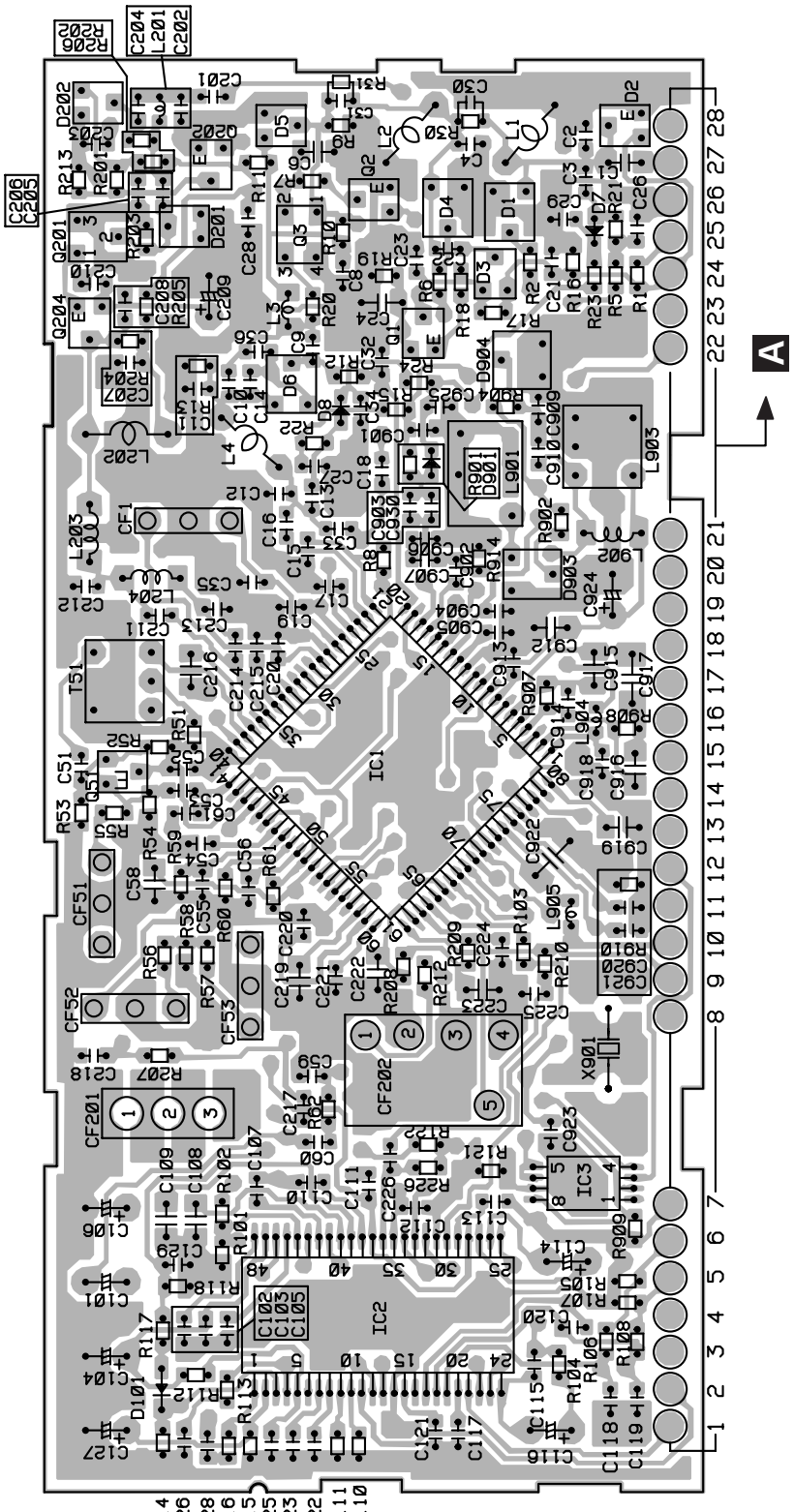


SIDE B


Q401
C405
D452
C468
R423
C407
C458
L402
D451
L453
C460
C461
L454
L451
L452
C459
R931
C432
C433
C591
R592
R591
R681
C311
C309
C901
R941
D981
Q302
C304
R982
R952
R304
Q301
C301
R303
R301
R302
D951
R357
R369
R951
R351
C357
R370
R353
C358
R352
C141
R356
R355
R354
L141
R107
Q101
R104
R106
Q102
R103
R102
R101
C101
IC101
C172
R700
R699
C686
C259
R203
R241
C219
C215
C241
C217
C228
C226
C225
C207
C209
C221
C223
C224
C222
C220
D272
D271
R284
R283
C292
D291
C287
C281
R985
R201
R204
C216
C242
C218
C229
R210
R209
R208
R242
C291
C265
C266
C974
C293
C260
C204
D983
R251
R256
R252
R254
R260
R258
C256
R257
R259
R253
R255
C255
C235
C975
C239
R235
C236
C237
D232
D234
D231
R231
C233
C238
R234
R232
C234
R233
IC231
R236
C240
D233
C231
R659
C852
R852
R853
C854
C851
Q853
Q852
Q261
D984
R654
C203
R696
R656
R653
R652
R651
R655
R697
D971
R606
C651
C261
C262
C201
R263
R262
R261
R809
R818
Q807
Q132
D131
R134
R136
R132
Q805
R807
R819
R133
Q131
R135
R698
C856
C855
R864
R862
C857
R612
C613

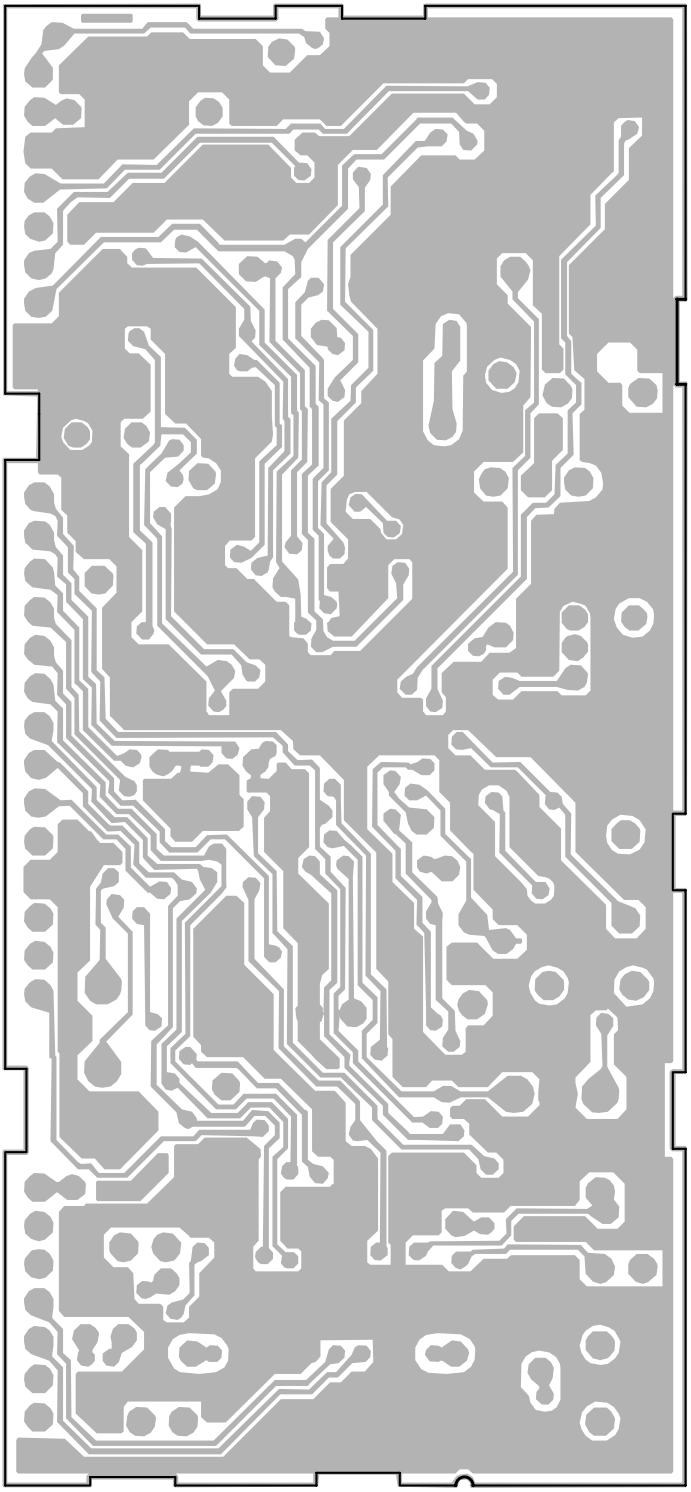
4.2 FM/AM TUNER UNIT

SIDE A



B FM/AM TUNER UNIT

SIDE B

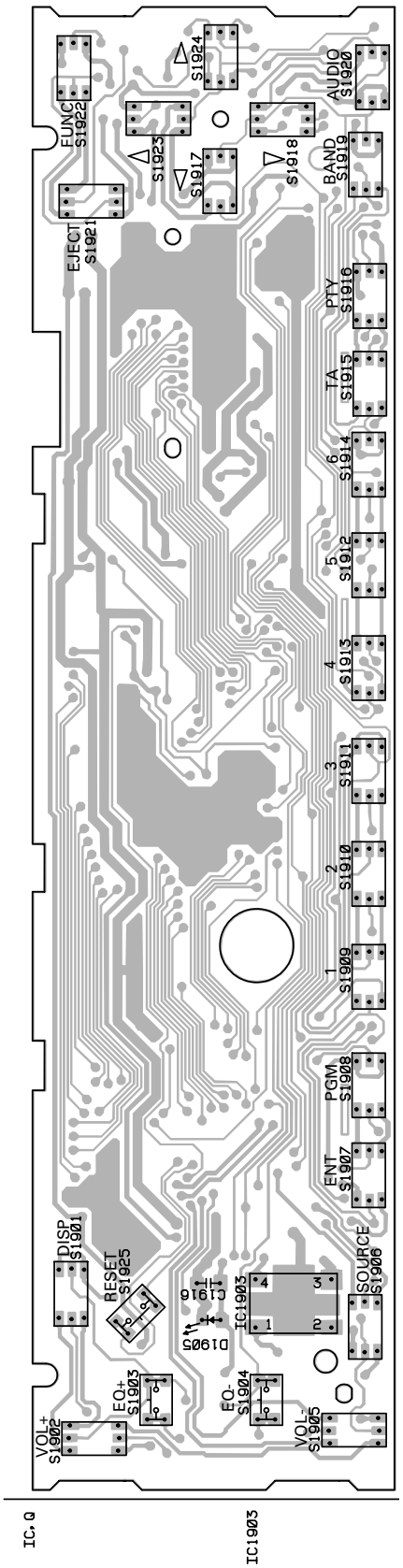


B FM/AM TUNER UNIT

4.3 KEYBOARD UNIT

C KEYBOARD UNIT

SIDE A

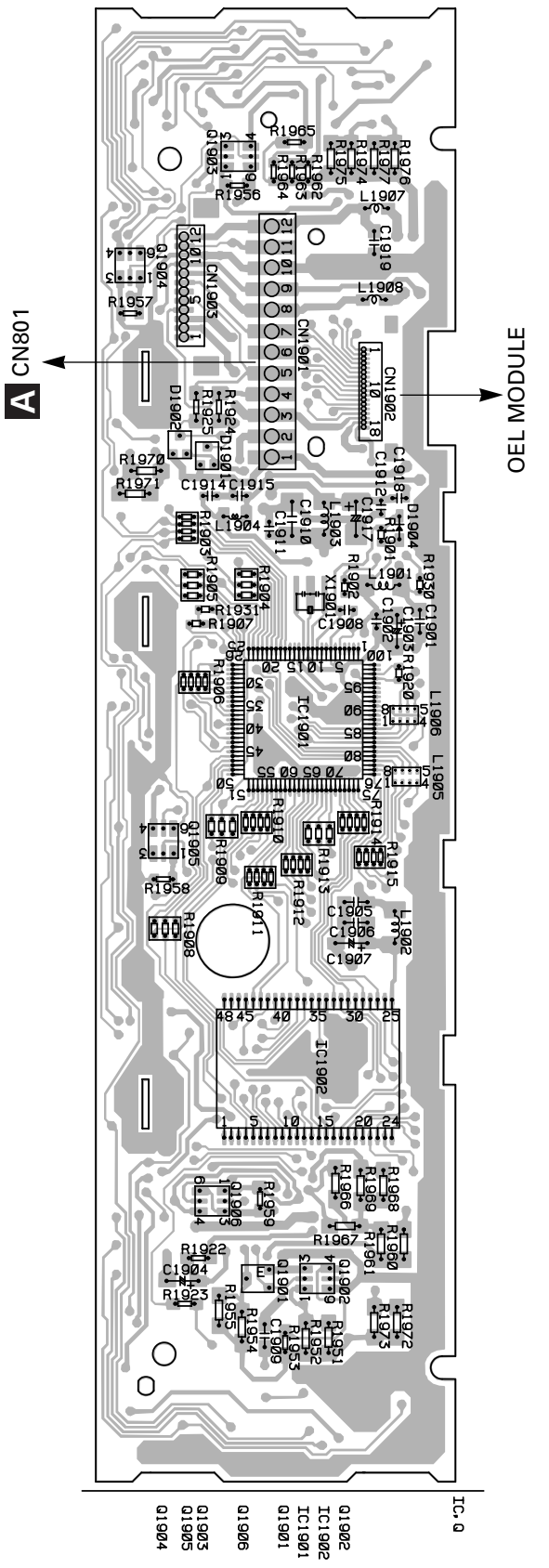


C KEYBOARD UNIT

SIDE B

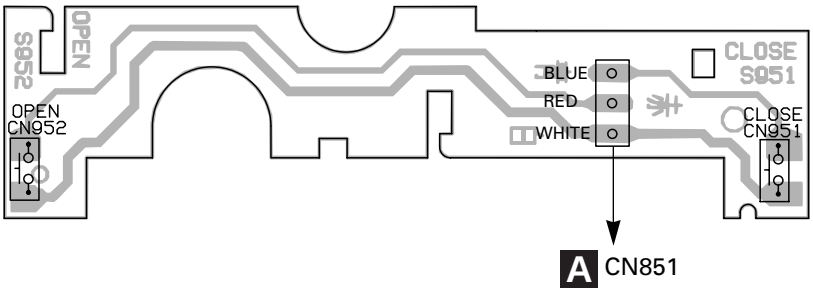
A CN801

OEL MODULE



4.4 SWITCH PCB

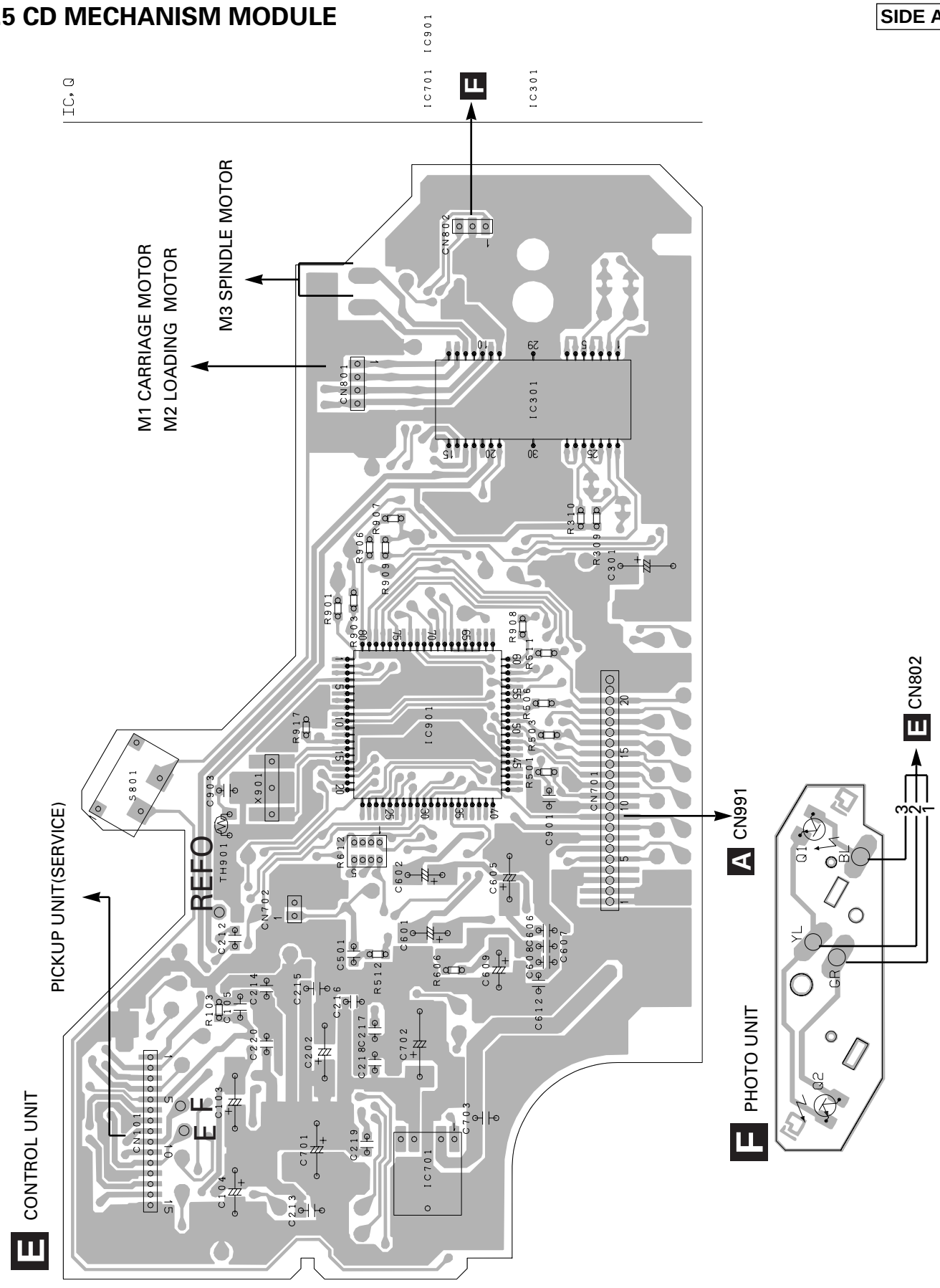
D SWITCH PCB



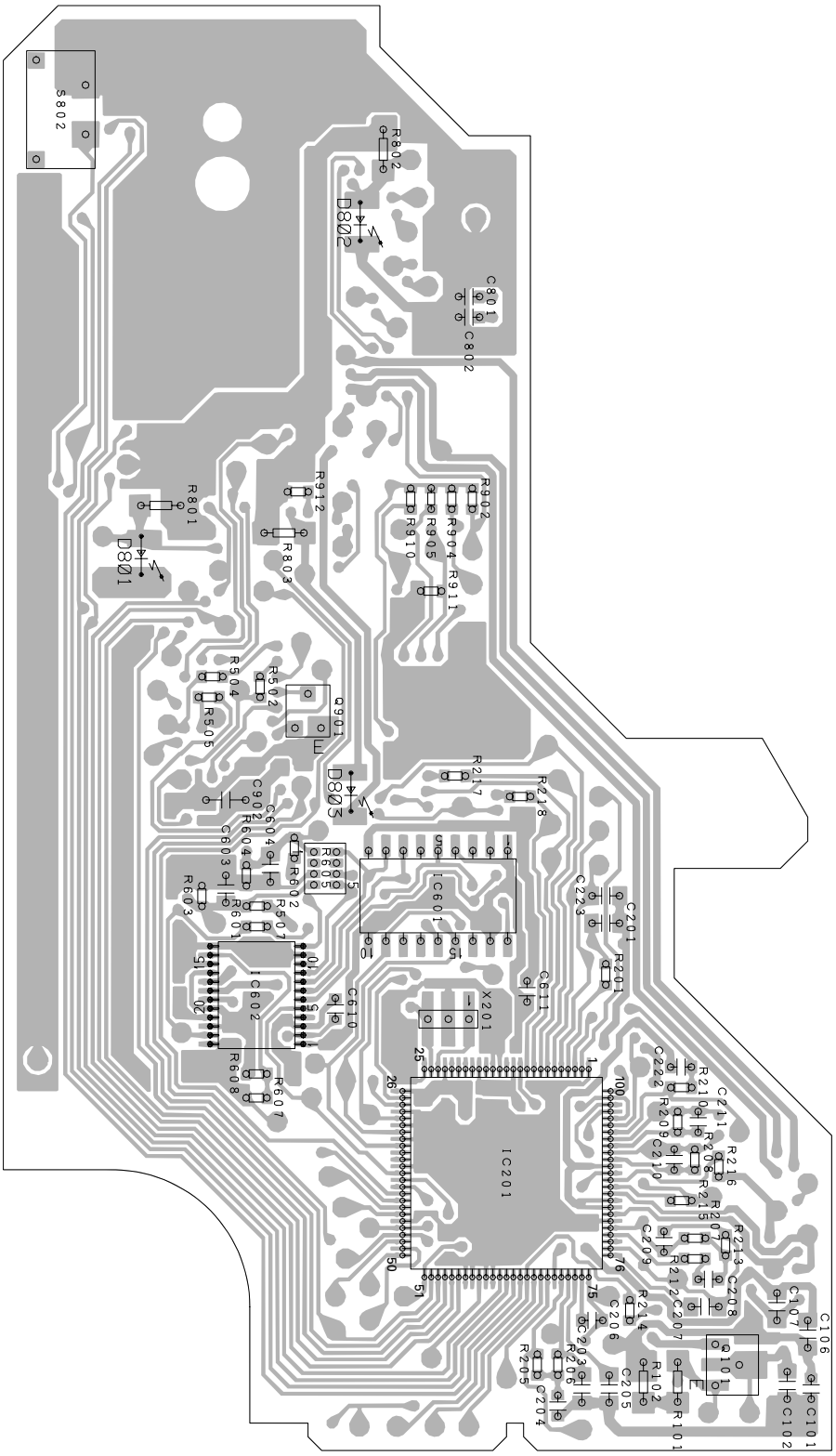
A CN851

4.5 CD MECHANISM MODULE

SIDE A



SIDE B



CONTROL UNIT

5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWM6220
Unit Name : Tuner Amp Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	101	IC	CA0008AM
IC	203	IC	PML004AF
IC	231	IC	NJM2068MD
IC	271	IC	PA2028A
IC	301	IC	PAL005A
IC	401	IC	S-81250SGUP
IC	501	IC	PM4009A
IC	601	IC	PD5486A
IC	851	IC	BA6288FS
IC	961	IC	S-80735ANDZI
Q	101	Transistor	2SA1162
Q	102	Transistor	DTC124EK
Q	151	Transistor	2SD1757K
Q	152	Transistor	2SD1757K
Q	153	Transistor	IMH3A
Q	154	Transistor	DTA114EK
Q	155	Transistor	2SC2412K
Q	261	Transistor	IMD2A
Q	301	Transistor	DTC124EK
Q	302	Transistor	DTC124EK
Q	351	Transistor	2SC3326
Q	352	Transistor	2SC3326
Q	353	Transistor	2SC3326
Q	354	Transistor	2SC3326
Q	401	Transistor	2SC2412K
Q	402	Transistor	2SC2412K
Q	501	Transistor	DTA124EK
Q	641	Transistor	DTC114EK
Q	681	Transistor	2SA1162
Q	682	Transistor	DTC124EK
Q	683	Transistor	2SC2412K
Q	801	Transistor	2SD1760F5
Q	802	Transistor	IMD2A
Q	803	Transistor	2SD2396
Q	805	Transistor	2SC2412K
Q	806	Transistor	2SB1238
Q	807	Transistor	DTC143EK
Q	808	Transistor	IMD2A
Q	851	Transistor	2SD1760F5
Q	852	Transistor	DTA114EK
Q	853	Transistor	DTC124EK
Q	911	Transistor	2SD1760F5
Q	913	Transistor	IMD2A
Q	921	Transistor	2SD2396
Q	922	Transistor	DTC114EK
Q	923	Transistor	2SB1238
Q	931	Transistor	IMX1
Q	932	Transistor	DTC114EK
Q	951	Transistor	2SA1162
Q	962	Transistor	2SC2412K

=====Circuit Symbol and No.		===Part Name	Part No.
Q	981	Transistor	2SC2412K
Q	982	Transistor	2SC2412K
Q	991	Transistor	IMD2A
Q	998	Transistor	2SD2396
D	231	Diode Network	DA204U
D	232	Diode Network	DA204U
D	233	Diode Network	DA204U
D	234	Diode Network	DA204U
D	401	Diode	1SR154-400
D	402	Diode	HZS16(2)
D	683	LED	BR4361F
D	801	Diode Network	DA204U
D	802	Diode Network	DA204U
D	803	Diode Network	DA204U
D	804	Diode Network	DA204U
D	805	Diode	MA3056(M)
D	806	Diode	HZS9L(C2)
D	807	LED	CL170PGCD
D	808	LED	CL170PGCD
D	809	LED	CL170PGCD
D	810	Diode	MA3062(M)
D	851	Diode	HZS7L(C3)
D	852	Diode	1SS133
D	853	Diode	1SS133
D	901	Diode	ERA15-02VH
D	902	Diode	ERA15-02VH
D	903	Diode	ERA15-02VH
D	911	Diode	ERA15-02VH
D	912	Diode	HZS6L(B1)
D	921	Diode	HZS9L(C1)
D	931	Diode	HZS7L(A1)
D	932	Diode	HZS7L(C3)
D	933	Diode	ERA15-02VH
D	951	Diode	MA152WK
D	961	Diode	MA152K
D	981	Diode	MA152WK
D	982	Diode	HZS9L(A2)
D	983	Diode	MA152K
D	984	Diode	MA152WK
D	985	Diode	1SS133
D	991	Diode	HZS9L(B1)
ZNR	451	Surge Protector	DSPS-201M-S00B
L	101	Inductor	LAU3R3K
L	251	Ferri-Inductor	LAU2R2K
L	271	Ferri-Inductor	LAU101K
L	401	Ferri-Inductor	LAU2R2K
L	402	Inductor	LCTB4R7K2125
L	403	Inductor	CTF1420
L	404	Inductor	LCTA1R0J3225
L	501	Inductor	CTF1295
L	502	Inductor	CTF1420
L	601	Inductor	LAU100K
L	801	Inductor	LAU100K
L	802	Inductor	CTF1484
L	951	Ferri-Inductor	LAU2R2K

=====Circuit Symbol and No.		===Part Name	Part No.
X	501	Crystal Resonator 3.648MHz	CSS1447
X	601	Radiator 10.00MHz	CSS1475
SP	641	Buzzer	CPV1012
		FM/AM Tuner Unit	CWE1500

RESISTORS

R	101		RS1/10S101J
R	102		RS1/10S620J
R	103		RS1/10S101J
R	104		RS1/10S222J
R	105		RS1/10S103J
R	106		RS1/10S562J
R	107		RS1/10S332J
R	108		RS1/16S102J
R	109		RS1/16S102J
R	110		RS1/16S223J
R	111		RS1/16S223J
R	112		RS1/16S181J
R	113		RS1/16S181J
R	153		RS1/10S224J
R	154		RS1/10S224J
R	155		RS1/10S222J
R	156		RS1/10S222J
R	157		RS1/10S223J
R	158		RS1/10S223J
R	159		RS1/10S224J
R	160		RS1/16S473J
R	161		RS1/16S162J
R	162		RS1/16S162J
R	163		RS1/16S272J
R	164		RS1/16S272J
R	165		RS1/10S104J
R	166		RS1/10S104J
R	201		RS1/10S0R0J
R	203		RS1/10S102J
R	204		RS1/10S102J
R	205		RA3C102J
R	231		RS1/10S474J
R	232		RS1/10S474J
R	233		RS1/10S104J
R	234		RS1/10S104J
R	235		RS1/10S273J
R	236		RS1/10S273J
R	283		RS1/10S203J
R	284		RS1/10S0R0J
R	301		RS1/10S103J
R	302		RS1/10S103J
R	303		RS1/10S103J
R	304		RS1/10S331J
R	351		RS1/10S820J
R	352		RS1/10S820J
R	353		RS1/10S820J
R	354		RS1/10S820J
R	357		RS1/16S223J
R	358		RS1/16S223J
R	359		RS1/16S223J
R	360		RS1/16S223J
R	363		RS1/16S103J
R	364		RS1/16S103J
R	365		RS1/16S103J
R	366		RS1/16S103J
R	369		RS1/16S471J
R	370		RS1/16S471J
R	371		RS1/16S471J
R	372		RS1/16S471J
R	375		RS1/10S0R0J

=====Circuit Symbol and No.		===Part Name	Part No.
R	376		RS1/10S0R0J
R	401		RS1/10S473J
R	402		RS1/10S473J
R	403		RS1/10S681J
R	404		RS1/10S681J
R	405		RS1/10S681J
R	406		RS1/10S102J
R	407		RS1/10S473J
R	409		RS1/16S681J
R	410		RS1/16S103J
R	411		RS1/16S681J
R	412		RS1/16S681J
R	413		RS1/16S681J
R	414		RS1/16S473J
R	415		RS1/16S472J
R	416		RS1/16S473J
R	417		RS1/16S473J
R	418		RS1/10S473J
R	419		RS1/10S222J
R	420		RS1/10S222J
R	421		RS1/16S681J
R	422		RS1/16S681J
R	423		RS1/10S0R0J
R	424		RS1/16S393J
R	426		RS1/16S153J
R	427		RS1/16S474J
R	428		RS1/16S681J
R	431		RS1/8S151J
R	501		RS1/16S102J
R	502		RS1/16S102J
R	503		RS1/16S102J
R	507		RS1/10S0R0J
R	508		RS1/16S0R0J
R	511		RS1/16S102J
R	512		RS1/16S0R0J
R	513		RS1/16S225J
R	514		RS1/10S0R0J
R	518		RS1/16S681J
R	601		RS1/16S473J
R	602		RS1/16S472J
R	603		RS1/16S221J
R	604		RS1/16S682J
R	605		RS1/16S221J
R	606		RS1/16S682J
R	607		RS1/16S102J
R	608		RS1/16S102J
R	609		RS1/16S473J
R	610		RS1/16S473J
R	611		RS1/16S473J
R	614		RS1/16S221J
R	615		RS1/16S682J
R	616		RS1/16S221J
R	617		RS1/16S473J
R	618		RS1/16S221J
R	619		RS1/16S682J
R	620		RS1/16S473J
R	623		RS1/16S473J
R	627		RS1/16S473J
R	628		RS1/16S473J
R	633		RS1/10S0R0J
R	634		RS1/10S102J
R	637		RS1/16S473J
R	641		RS1/10S202J
R	642		RS1/10S102J
R	654		RS1/10S0R0J

Circuit Symbol and No.		Part Name	Part No.
R	655		RS1/10S0R0J
R	656		RS1/10S0R0J
R	658		RS1/16S473J
R	659		RS1/16S0R0J
R	681		RS1/8S102J
R	686		RS1/10S103J
R	687		RS1/10S223J
R	688		RS1/10S223J
R	689		RS1/10S223J
R	690		RS1/10S272J
R	695		RS1/16S473J
R	698		RS1/8S471J
R	699		RS1/10S102J
R	700		RS1/10S103J
R	801		RS1/8S222J
R	802		RS1/8S222J
R	803		RS1/8S222J
R	804		RS1/8S103J
R	805		RS1/8S472J
R	806		RS2PMF220J
R	807		RS1/8S221J
R	809		RS1/10S103J
R	810		RS1/10S222J
R	811		RD1/4PU102J
R	812		RS1/10S152J
R	813		RS1/4S221J
R	814		RD1/4PU391J
R	818		RS1/10S103J
R	819		RS1/8S221J
R	820		RS1/10S1R0J
R	821		RS1/10S1R0J
R	851		RD1/4PU271J
R	852		RS1/10S102J
R	853		RS1/10S102J
R	862		RS1/10S102J
R	864		RS1/10S102J
R	911		RS1/10S0R0J
R	912		RS1/10S152J
R	913		RS1/10S512J
R	914		RS1/10S1R0J
R	921		RS1/10S1R0J
R	922		RD1/4PU221J
R	923		RS1/10S102J
R	924		RS1/4S152J
R	926		RS1/10S223J
R	931		RS1/10S472J
R	932		RS1/10S473J
R	933		RS1/10S103J
R	934		RS1/10S473J
R	935		RS1/10S103J
R	936		RS1/10S103J
R	951		RS1/8S153J
R	952		RS1/10S472J
R	953		RS1/10S472J
R	954		RS1/16S102J
R	962		RS1/10S102J
R	963		RS1/10S473J
R	964		RS1/10S822J
R	981		RS1/16S223J
R	982		RS1/10S473J
R	983		RS1/10S103J
R	984		RS1/10S473J
R	985		RS1/10S102J
R	986		RS1/10S224J
R	989		RS1/10S473J
R	991		RD1/4PU221J
R	992		RS1/10S221J

Circuit Symbol and No.		Part Name	Part No.
CAPACITORS			
C	101		CKSQYB104K16
C	102		CKSQYB104K16
C	151		CEJA1R0M50
C	152		CEJA1R0M50
C	153		CKSQYB223K50
C	161		CKSQYB123K25
C	162		CKSQYB123K25
C	171		CEJA470M16
C	172		CKSQYB104K16
C	173		CEJA100M16
C	203		CKSYB225K16
C	204		CKSYB225K16
C	205		CKSYB224K16
C	206		CKSYB224K16
C	207		CKSYB105K16
C	208		CKSYB105K16
C	209		CKSYB105K16
C	210		CKSYB105K16
C	211		CEJANP4R7M16
C	212		CEJANP4R7M16
C	213		CEJANP4R7M16
C	214		CEJANP4R7M16
C	215		CKSQYB473K50
C	216		CKSQYB473K50
C	217		CKSQYB473K50
C	218		CKSQYB473K50
C	219		CKSYB105K16
C	220		CKSYB105K16
C	221		CKSYB105K16
C	222		CKSYB105K16
C	223		CKSYB105K16
C	224		CKSYB105K16
C	225		CKSQYB333K50
C	226		CKSQYB123K50
C	227		CKSQYB473K50
C	228		CKSQYB153K50
C	229		CKSQYB153K50
C	231		CKSQYB103K50
C	233		CKSQYB474K16
C	234		CKSQYB474K16
C	235		CKSQYB104K16
C	236		CKSQYB104K16
C	237		CKSQYB104K25
C	238		CKSQYB104K25
C	239		CCSQCH470J50
C	240		CCSQCH470J50
C	241		CKSQYB152K50
C	242		CKSQYB152K50
C	262		CKSYB475K10
C	277		CEJA4R7M35
C	278		CEJA101M16
C	279		CEJA100M16
C	280		CEJA100M16
C	281		CKSYB225K16
C	282		CEJA330M25
C	283		CEJA330M25
C	286		CASAQ3R3M16
C	287		CKSYB684K25
C	301		CKSQYB224K16
C	302		CKSQYB224K16
C	303		CKSQYB224K16
C	304		CKSQYB224K16
C	306		CEJA330M10
C	307	470µF/16	CCH1339
C	309		CKSQYB104K16

=====Circuit Symbol and No.		===Part Name	Part No.
C	310		CEJA100M16
C	311		CKSYB105K16
C	351		CEJA100M35
C	352		CEJA100M35
C	353		CEJA100M35
C	354		CEJA100M35
C	357		CKSRYB222K50
C	358		CKSRYB222K50
C	359		CKSRYB222K50
C	360		CKSRYB222K50
C	401		CKSQYB182K50
C	403		CKSQYB473K16
C	404		CEJA101M10
C	405		CKSQYB103K50
C	406		CEJA220M10
C	407		CKSQYB103K50
C	408		CKSQYB223K50
C	409		CKSQYB223K50
C	411		CKSRYB472K50
C	412		CKSQYB472K50
C	413		CKSQYB103K50
C	431		CEJA101M16
C	432		CKSQYB104K16
C	435		CCSQCH101J50
C	502		CCSQCH101J50
C	503		CCSQCH270J50
C	504		CCSQCH270J50
C	505		CKSQYB104K16
C	506		CKSQYB471K50
C	507		CKSQYB471K50
C	508		CKSQYB104K16
C	509		CEJA220M6R3
C	511		CKSQYB103K50
C	512		CCSRCH101J50
C	601		CEJA4R7M35
C	602		CKSQYB103K50
C	603		CCSQCH101J50
C	604		CCSQCH180J50
C	605		CCSQCH180J50
C	651		CKSYB225K16
C	683		CKSQYB103K50
C	686		CKSQYB473K16
C	801		CKSYB475K10
C	802		CKSQYB104K16
C	803		CEJA470M10
C	804		CKSQYB103K50
C	805		CEJA470M10
C	806		CKSQYB103K50
C	807		CKSQYB102K50
C	808		CKSYB221K50
C	809		CKSYB103K50
C	810		CKSYB475K10
C	811		CKSYB225K16
C	812		CCSCH101J50
C	813		CKSQYB103K50
C	814		CKSQYB105K10
C	851		CKSQYB103K50
C	852		CKSYB104K16
C	853		CEJA220M16
C	855		CKSQYB102K50
C	856		CCSQCH101J50
C	857		CCSQCH101J50
C	901		CKSYB103K50
C	911	470µF/16V	CCH1183
C	912		CKSQYB472K50
C	913		CKSQYB103K50
C	914		CEJA470M10
C	915	470µF/16V	CCH1183
C	921	330µF/10V	CCH1181
C	922		CKSQYB103K50

=====Circuit Symbol and No.		===Part Name	Part No.
C	923		CEJA101M16
C	931		CKSYB105K16
C	951		CKSYB103K50
C	961		CKSQYB102K50
C	962		CKSQYB104K16
C	963		CEJA2R2M50
C	981		CEJA220M16
C	991		CKSQYB473K50
C	992		CKSQYB102K50
C	993		CEJA101M10

B Unit Number : CWE1500
Unit Name : FM/AM Tuner Unit

MISCELLANEOUS

IC	1	IC	PML002A
IC	2	IC	PM4008A
IC	3	IC	BR9010FV
Q	1	Transistor	2SC4081
Q	2	Transistor	DTC124EU
Q	3	FET	3SK263
Q	51	Transistor	2SC4081
Q	201	FET	2SK932
Q	202	Transistor	DTC124EU
Q	204	Transistor	2SC4081
D	1	Diode	KV1410(23)
D	2	Diode	1SV248
D	4	Diode	KV1410(23)
D	6	Diode	KV1410(23)
D	101	Diode	MA110
D	201	Diode	MA143
D	202	Diode	MA147
D	903	Diode	KV1410(23)
D	904	Diode	SVC253
L	1	Coil	CTC1155
L	2	Coil	CTC1155
L	3	Inductor	LCTB100K2125
L	4	Coil	CTC1155
L	201	Inductor	LCTB330K1608
L	202	Inductor	CTF1287
L	203	Inductor	LCTA121J3225
L	901	Coil	CTC1154
L	902	Inductor	LCTA3R3J3225
L	904	Inductor	LCTBR47K1608
L	905	Inductor	LCTBR47K1608
T	51	Coil	CTE1132
CF	51	Ceramic Filter	CTF1442
CF	52	Ceramic Filter	CTF1442
CF	53	Ceramic Filter	CTF1442
CF	202	Ceramic Filter	CTF1476
X	901	Crystal Resonator 10.250MHz	CSS1432

RESISTORS

R	1	RS1/16S153J
R	2	RS1/16S103J
R	6	RS1/16S103J
R	7	RS1/16S273J
R	8	RS1/16S473J
R	9	RS1/16S223J
R	10	RS1/16S473J
R	11	RS1/16S221J
R	12	RS1/16S103J
R	13	RS1/16S104J
R	16	RS1/16S223J
R	17	RS1/16S221J
R	18	RS1/16S221J
R	19	RS1/16S473J
R	20	RS1/16S470J

Circuit Symbol and No.	Part Name	Part No.
R 51		RS1/16S470J
R 52		RS1/16S103J
R 53		RS1/16S103J
R 54		RS1/16S331J
R 55		RS1/16S331J
R 56		RS1/16S560J
R 57		RS1/16S560J
R 58		RS1/16S102J
R 59		RS1/16S225J
R 60		RS1/16S133J
R 61		RS1/16S433J
R 62		RS1/16S562J
R 101		RS1/16S333J
R 102		RS1/16S103J
R 103		RS1/16S333J
R 104		RS1/16S562J
R 106		RS1/16S0R0J
R 108		RS1/16S0R0J
R 110		RS1/16S154J
R 111		RS1/16S273J
R 112		RS1/16S223J
R 113		RS1/16S222J
R 114		RS1/16S333J
R 115		RS1/16S334J
R 116		RS1/16S473J
R 117		RS1/16S333J
R 118		RS1/16S223J
R 122		RS1/16S0R0J
R 202		RS1/16S472J
R 203		RS1/16S225J
R 204		RS1/16S102J
R 205		RS1/16S220J
R 206		RS1/16S471J
R 208		RS1/16S104J
R 209		RS1/16S104J
R 210		RS1/16S563J
R 213		RS1/16S223J
R 902		RS1/16S103J
R 904		RS1/16S473J
R 907		RS1/16S103J
R 908		RS1/16S681J
R 909		RS1/16S473J
R 914		RS1/16S562J

CAPACITORS

Circuit Symbol and No.	Part Name	Part No.
C 1		CCSQCH5R0C50
C 2		CCSRCH5R0C50
C 4		CCSRCJ3R0C50
C 6		CKSQYB105K10
C 8		CKSRYB222K50
C 10		CCSRCH220J50
C 11		CCSRCH150J50
C 12		CCSRCH8R0D50
C 14		CCSRCJ3R0C50
C 15		CKSRYB103K50
C 16		CKSRYB222K50
C 17		CKSRYB222K50
C 18		CCSRCJ3R0C50
C 19		CKSRYB103K50
C 20		CKSRYB103K50
C 21		CKSRYB103K50
C 24		CKSQYB334K16
C 31		CKSRYB222K50
C 32		CCSRCH470J50
C 35		CKSRYB103K50
C 51		CKSRYB103K50
C 52		CKSRYB473K16
C 53		CCSRCK2R0C50
C 54		CKSRYB103K50
C 55		CKSRYB104K16
C 56		CKSRYB104K16
C 58		CKSQYB224K16
C 59		CKSRYB223K25
C 60		CKSRYB104K16
C 101		CEALNP100M10
C 102		CCSRCH151J50
C 103		CKSRYB473K16
C 105		CKSRYB682K25
C 106		CEAL2R2M50
C 107		CKSRYB103K50
C 108		CKSQYB474K16
C 109		CKSQYB474K16
C 110		CKSRYB104K16
C 111		CKSRYB104K16
C 112		CKSRYB104K16
C 113		CKSRYB123K25
C 114		CEAL220M6R3
C 115		CKSRYB473K16
C 116		CEAL2R2M50
C 117		CKSRYB102K50
C 120		CKSRYB153K25
C 121		CKSRYB332K50
C 122		CKSRYB682K25
C 123		CKSRYB681K50
C 125		CKSRYB103K50
C 126		CKSRYB103K50
C 127		CEAL2R2M50
C 128		CKSRYB103K50
C 201		CCSRCH471J50
C 202		CCSRCH100D50
C 203		CKSRYB104K16
C 204		CKSRYB332K50
C 205		CKSRYB103K50
C 206		CKSRYB104K16
C 207		CKSRYB473K16
C 208		CCSRCH560J50
C 209		CEAL470M6R3
C 210		CKSRYB103K50
C 211		CKSRYB103K50
C 212		CCSRCH101J50
C 215		CKSRYB223K25
C 216		CKSQYB334K16
C 217		CKSRYB103K50
C 219		CKSQYB105K10
C 220		CKSRYB104K16
C 221		CKSRYB473K16
C 222		CKSQYB334K16
C 223		CKSQYB474K16
C 224		CKSRYB104K16
C 225		CKSRYB272K50
C 226		CKSRYB682K25
C 902		CCSRCH270J50
C 904		CKSRYB223K25
C 905		CKSRYB103K50
C 906		CCSRTH100D50
C 907		CCSRTH150J50
C 909		CCSRTH100D50
C 910		CKSRYB332K50
C 912		CKSQYB474K16
C 913		CKSRYB223K25
C 914		CKSRYB682K25
C 915		CKSQYB223K25
C 916		CKSQYB474K16
C 917		CKSYB475K10
C 918		CKSRYB223K25
C 919		CKSQYB225K10
C 920		CCSRCH270J50
C 921		CCSRCH270J50
C 922		CKSYB105K16
C 923		CKSRYB103K50

C Unit Number : CWM6225
Unit Name : Keyboard Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	1901	IC	PD5471A
IC	1902	IC	PD8051A
IC	1903	HIC Module	RS-140
Q	1901	Transistor	DTC143TK
Q	1902	Transistor	IMH10A
Q	1903	Transistor	IMH10A
Q	1904	Transistor	IMH10A
Q	1905	Transistor	IMH10A
Q	1906	Transistor	IMH10A
D	1901	Diode Network	DA204U
D	1902	Diode Network	DA204U
D	1904	Diode	MA110
D	1905	LED	CL170UBX
L	1901	Chip Inductor	LCTA2R2J3225
L	1902	Chip Inductor	LCTA2R2J3225
L	1903	Inductor	CTF1484
L	1904	Inductor	LCTA220J2520
L	1905	Inductor Array	CTF1421
L	1906	Inductor Array	CTF1421
L	1907	Inductor	CTF1295
L	1908	Inductor	CTF1295
X	1901	Ceramic Resonator 15.62MHz	CSS1458
S	1901	Push Switch	CSG1113
S	1902	Push Switch	CSG1113
S	1903	Push Switch	CSG1111
S	1904	Push Switch	CSG1111
S	1905	Push Switch	CSG1113
S	1906	Push Switch	CSG1113
S	1907	Push Switch	CSG1113
S	1908	Push Switch	CSG1113
S	1909	Push Switch	CSG1113
S	1910	Push Switch	CSG1113
S	1911	Push Switch	CSG1113
S	1912	Push Switch	CSG1113
S	1913	Push Switch	CSG1113
S	1914	Push Switch	CSG1113
S	1915	Push Switch	CSG1113
S	1916	Push Switch	CSG1113
S	1917	Push Switch	CSG1113
S	1918	Push Switch	CSG1113
S	1919	Push Switch	CSG1113
S	1920	Push Switch	CSG1113
S	1921	Push Switch	CSG1113
S	1922	Push Switch	CSG1113
S	1923	Push Switch	CSG1113
S	1924	Push Switch	CSG1113
S	1925	Push Switch	CSG1111

RESISTORS

=====Circuit Symbol and No.		===Part Name	Part No.
R	1901		RS1/16S154J
R	1902		RS1/16S473J
R	1903		RA4C101J
R	1904		RA3C101J
R	1905		RA3C101J
R	1906		RA4C101J
R	1907		RS1/16S473J
R	1908		RA3C101J
R	1909		RA3C101J
R	1910		RA4C101J
R	1911		RA4C101J
R	1912		RA4C101J
R	1913		RA3C101J
R	1914		RA4C101J
R	1915		RA4C101J
R	1922		RS1/10S121J
R	1923		RS1/10S2R2J
R	1924		RS1/8S222J
R	1925		RS1/8S222J
R	1930		RS1/16S472J
R	1931		RS1/16S473J
R	1951		RS1/8S242J
R	1952		RS1/8S242J
R	1953		RS1/10S103J
R	1954		RS1/8S242J
R	1955		RS1/8S242J
R	1960		RS1/8S911J
R	1961		RS1/8S911J
R	1962		RS1/10S511J
R	1963		RS1/10S511J
R	1964		RS1/10S511J
R	1965		RS1/10S511J
R	1966		RS1/8S511J
R	1967		RS1/8S511J
R	1968		RS1/8S511J
R	1969		RS1/8S511J
R	1970		RS1/8S511J
R	1971		RS1/8S511J
R	1972		RS1/8S511J
R	1973		RS1/8S511J
R	1974		RS1/8S751J
R	1975		RS1/8S751J
R	1976		RS1/8S751J
R	1977		RS1/8S751J

CAPACITORS

=====Circuit Symbol and No.		===Part Name	Part No.
C	1901		CKSQYB105K10
C	1902		CKSRYB103K25
C	1903		CSZS100M6R3
C	1904		CSZS100M6R3
C	1906		CKSQYB103K25
C	1907		CSZS100M6R3
C	1908		CKSRYB473K16
C	1911		CKSRYB473K16
C	1914		CKSRYB103K25
C	1916		CKSQYB104K25
C	1917		CSZSR100M16
C	1918		CKSRYB102K50
C	1919		CCSQCH221J50

D Unit Number :
Unit Name : Switch PCB

=====Circuit Symbol and No.		===Part Name	Part No.
S	951	Switch(CLOSE)	CSN1012
S	952	Switch(OPEN)	CSN1022

E Unit Number : CWX2358
Unit Name : Control Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	201	IC	UPD63710GC
IC	301	IC	BA5985FM
IC	602	IC	AK4321VF
IC	701	IC	BA05SFP
IC	901	IC	PE5011C
Q	101	Transistor	2SB1132
Q	901	Transistor	UN2111
D	801	LED	CL200IRX
D	802	LED	CL200IRX
TH	901	Thermistor	CCX1037
X	201	Ceramic Oscillator 16.934MHz	CSS1456
X	901	Radiator 8.380MHz	CSS1453
S	801	Spring Switch(HOME)	CSN1051
S	802	Spring Switch(CLAMP)	CSN1052

=====Circuit Symbol and No.		===Part Name	Part No.
RESISTORS			
R	101		RS1/8S120J
R	102		RS1/8S100J
R	103		RS1/16S222J
R	201		RS1/16S104J
R	205		RS1/16S103J
R	206		RS1/16S393J
R	207		RS1/16S182J
R	208		RS1/16S304J
R	210		RS1/16S0R0J
R	212		RS1/16S103J
R	213		RS1/16S103J
R	214		RS1/16S123J
R	215		RS1/16S273J
R	216		RS1/16S273J
R	217		RS1/16S681J
R	218		RS1/16S681J
R	309		RS1/16S473J
R	310		RS1/16S473J
R	501		RS1/16S102J
R	502		RS1/16S681J
R	503		RS1/16S681J
R	504		RS1/16S681J
R	505		RS1/16S681J
R	506		RS1/16S681J
R	511		RS1/16S0R0J
R	601		RS1/16S102J
R	602		RS1/16S102J
R	603		RS1/16S223J
R	604		RS1/16S223J
R	606		RS1/16S0R0J
R	607		RS1/16S0R0J
R	612		RA4C0R0J
R	801		RS1/8S751J
R	802		RS1/8S751J
R	901		RS1/16S222J
R	902		RS1/16S473J
R	903		RS1/16S222J
R	904		RS1/16S473J
R	905		RN1/16SE1502D
R	906		RS1/16S473J
R	908		RS1/16S222J
R	909		RS1/16S104J
R	910		RS1/16S103J
R	911		RS1/16S223J
R	912		RS1/16S473J
R	917		RS1/16S0R0J
CAPACITORS			
C	101		CCSRCH102J25
C	102		CKSQYB104K16
C	103		CEV101M6R3
C	104		CEV470M6R3
C	105		CKSQYB334K16
C	106		CKSQYB334K16
C	107		CKSQYB334K16
C	201		CKSQYB104K16
C	202		CEV101M6R3
C	203		CKSQYB104K16
C	204		CKSRYB332K50
C	205		CKSQYB104K16
C	206		CKSRYB392K50
C	207		CKSQYB224K16
C	208		CCSRCH270J50
C	209		CCSRCJ3R0C50
C	210		CCSRCH221J50
C	211		CCSRCH101J50
C	212		CKSRYB682K25

=====Circuit Symbol and No.		===Part Name	Part No.
C	213		CKSQYB104K16
C	214		CKSRYB104K16
C	215		CKSQYB104K16
C	216		CKSRYB104K16
C	217		CKSRYB104K16
C	218		CKSRYB104K16
C	219		CKSRYB104K16
C	220		CKSRYB104K16
C	223		CKSQYB471K50
C	301		CEV101M10
C	601		CEV4R7M35
C	602		CEV4R7M35
C	603		CCSQSL152J50
C	604		CCSQSL152J50
C	605		CEV470M6R3
C	606		CKSRYB104K16
C	607		CKSRYB104K16
C	608		CKSRYB104K16
C	609		CEV100M16
C	610		CKSRYB104K16
C	612		CKSRYB104K16
C	701		CEV101M6R3
C	702	22µF/6.3V	CCH1300
C	703		CKSQYB334K16
C	801		CKSRYB103K25
C	802		CKSRYB103K25
C	901		CKSRYB472K50
C	902		CKSYB475K10
C	903		CKSRYB103K25

F Unit Number :
Unit Name : Photo Unit

Q	1	Photo-transistor	CPT230SX-TU
Q	2	Photo-transistor	CPT230SX-TU

Miscellaneous Parts List

		Pickup Unit(Service)(P8)	CXX1285
M	1	Motor Unit(CARRIAGE)	CXB2190
M	2	Motor Unit(LOADING)	CXB2195
M	3	Motor Unit(SPINDLE)	CXB2562
M	951	Motor(AUTO FLAP)	CXM1085

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1) Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
  If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
  Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
  Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
  If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
  *During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
  *The unit will not load a disc.
  When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

2) Test Mode

This mode is used for adjusting the CD mechanism module of the device.

- Test mode starting procedure
  Reset while pressing the **4** and **6** keys together.

- Test mode cancellation
  Switch ACC, back-up OFF.

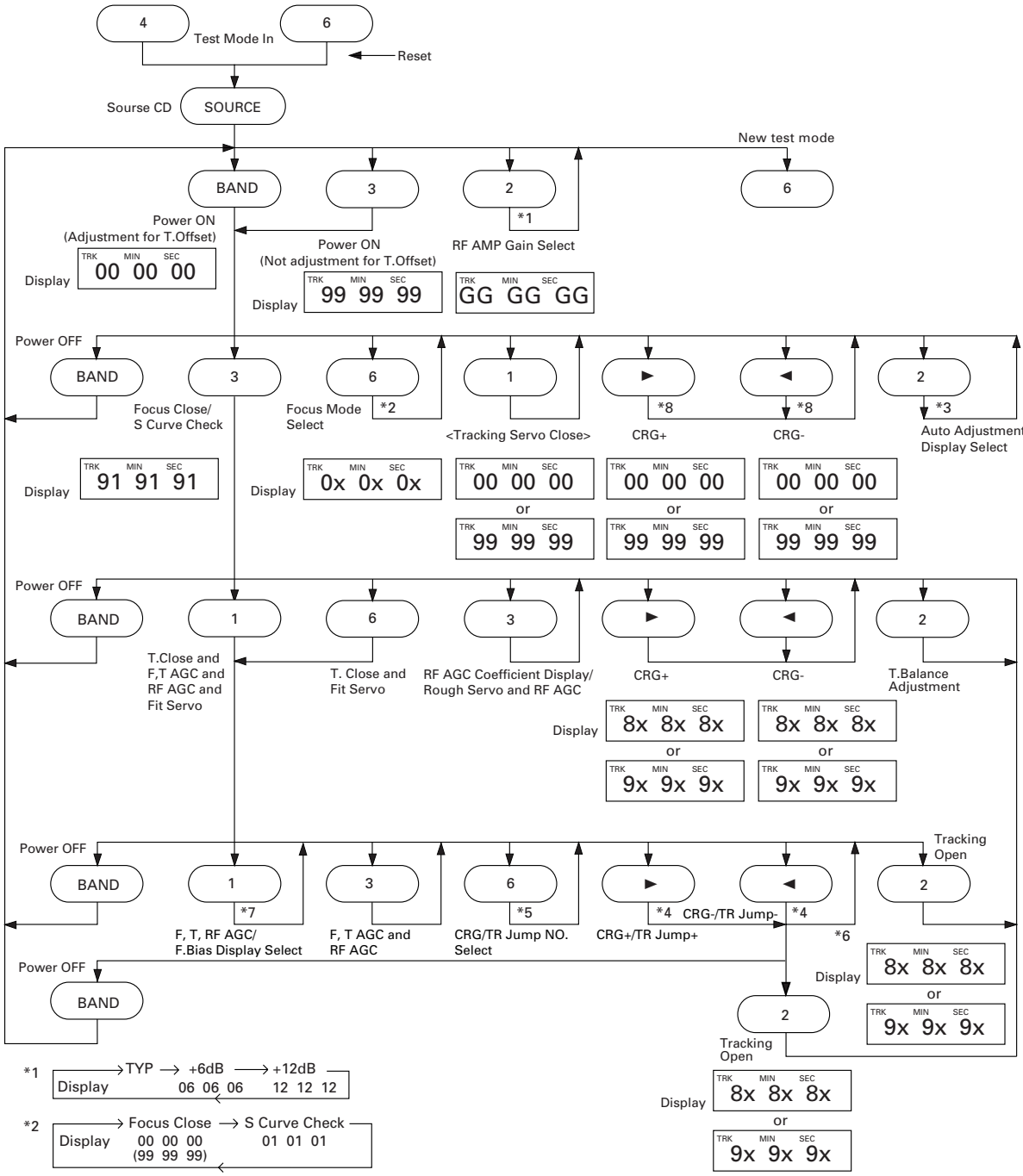
- After pressing the EJECT key, do not press any other key until the disk is completely ejected.

- If the ► or ◄ key is pressed while focus search is in progress, immediately turn the power off (otherwise the actuator may be damaged due to adhesion of the lenses).

- Jump operation of TRs other than 100TR continues after releasing the key. CRG move and 100TR jump operations are brought into the “Tracking close” status when the key is released.

- Powering Off/On resets the jump mode to “Single TR (91)”, the RF AMP gain setting to 0 dB, and the automatic adjustment value to the initial value.

● Flow Chart



*1 → TYP → +6dB → +12dB →
Display 06 06 06 12 12 12

*2 → Focus Close → S Curve Check →
Display 00 00 00 (99 99 99) 01 01 01

*3 → F.Offset Display → RF.Offset Display → F.Cansel Display →

F.Cancel Value = {Top Rank 8bit of Set Value (7F [H] to 80 [H]) + 128} / 4
= 63 [D] to (32 [D]) to 00 [D]

*4 Single TR/32TR/100TR

*5 → Single TR → 32TRK → 100TRK → CRG Move →
Display 9x(8x):91(81) 92(82) 93(83) 94(84)

*6 CRG Move, 100TR Jump Only

*7 → TRK, MIN, SEC → F.AGC Gain → T.AGC Gain → RF AGC Gain →
(F,T.AGC Gain = (Present Value/Initial Value) ¥ 20)

*8 Voltage of CRG Motor = 2 [V]

6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

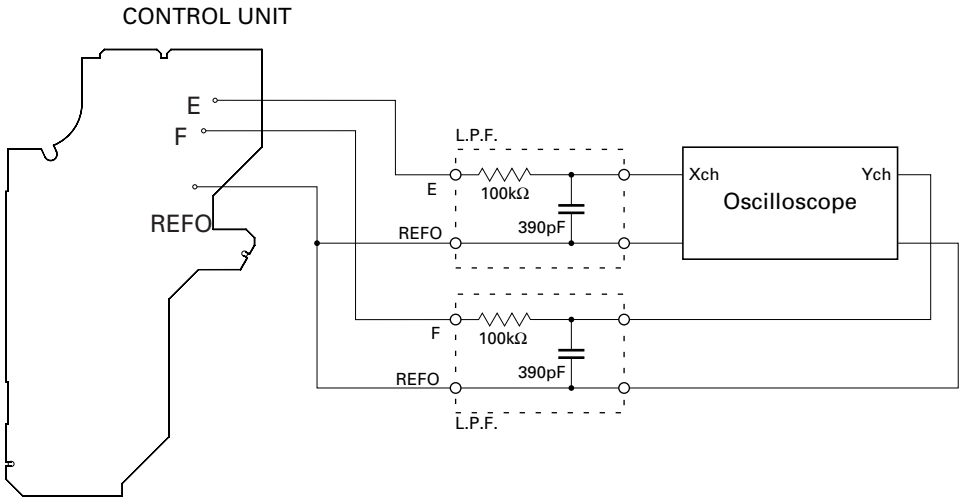
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFO
• Disc	• ABEX TCD-784
• Mode	• TEST MODE



• **Checking Procedure**
1. In test mode, load the disc and switch the 5V regulator on.
2. Using the ► and ◄ buttons, move the PU unit to the innermost track.
3. Press key **3** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **3** 2 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

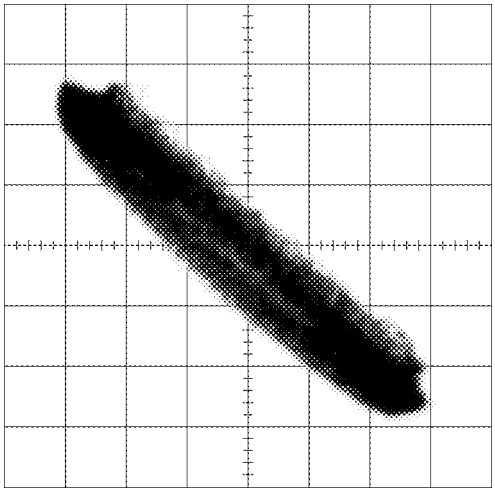
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

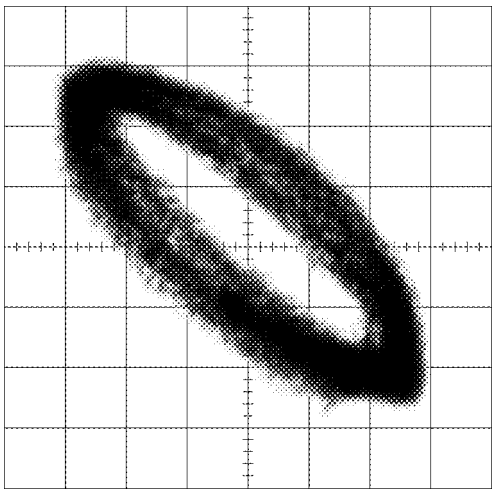
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

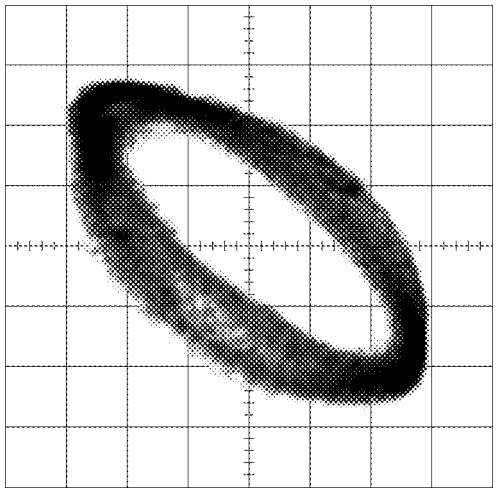
0°



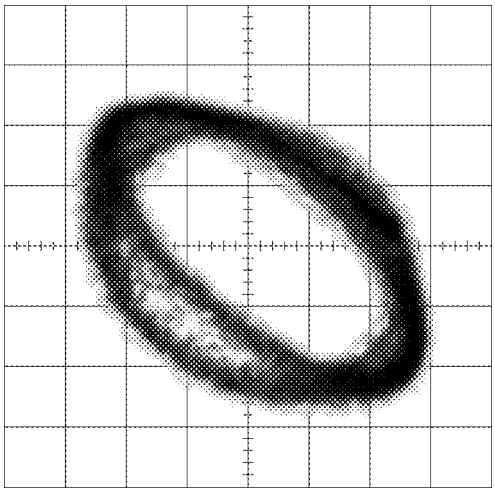
30°



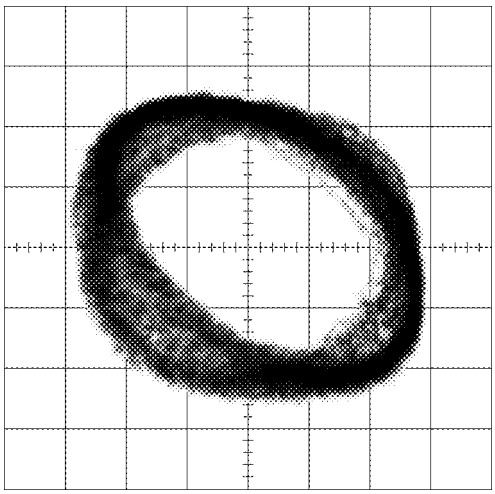
45°



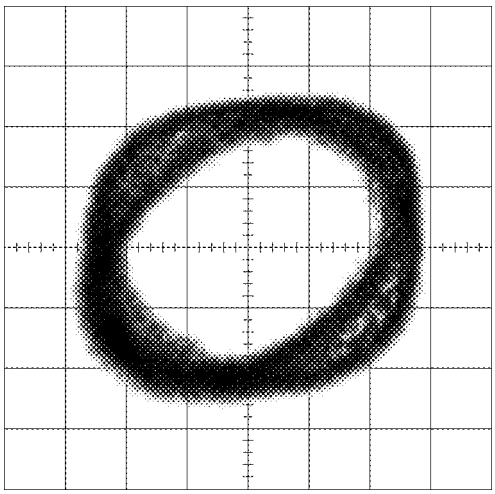
60°



75°



90°



7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 TEST MODE

● Error Messages

If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

(1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

2) Main unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.

8-digit display	6-digit display	4-digit display
ERROR–xx	ERR–xx OR Err–xx	E–xx

(2) Error Code List

Code	Class	Displayed error code	Description of the code and potential cause(s)
10	Electricity	Carriage Home NG	CRG can't be moved to inner diameter. CRG can't be moved from inner diameter. → Failure on home switch or CRG move mechanism.
11	Electricity	Focus Servo NG	Focusing not available. → Stains on rear side of disc or excessive vibrations on REWRITABLE.
12	Electricity	Spindle Lock NG	Spindle not locked. Sub-code is strange (not readable). → Failure on spindle, stains or damages on disc, or excessive vibrations.
		Subcode NG	A disc not containing CD-R data is found. Turned over disc are found, though rarely. → Failure on home switch or CRG move mechanism.
		RF AMP NG	An appropriate RF AMP gain can't be determined. → CD signal error.
17	Electricity	Setup NG	APC protection doesn't work. Focus can be easily lost. → Damages or stains on disc, or excessive vibrations.
30	Electricity	Search Time Out	Failed to reach target address. → CRG tracking error or damages on disc.
A0	System	Power Supply NG	Power (VD) is ground faulted. → Failure on SW transistor or power supply (failure on connector).

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).

Unreadable TOC does not constitute an error. An intended operation continues in this case.

A newly designed main unit must conform to the example given above.

Upper digits of an error code are subdivided as shown below:

1x: Setup relevant errors, 3x: Search relevant errors, 3x: Search relevant errors, Ax: Other errors.

● New Test Mode

S-CD plays the same way as before.

If an error such as off focus, spindle unlocking, unreadable sub-code, or sound skipping occurs after setup, its cause and time occurred (in absolute time) are displayed.

During setup, operational status of the control software (internal RAM: CPOINT) is displayed.

These displays and functions are prepared for enhancing aging in the servicing and efficiency of trouble analysis.

(1) Shifting to the New Test Mode

① Turn on the current test mode by starting the reset from the key (it varies between the products).

② Select S-CD for the source through the specified procedure including use of the [SOURCE] key, and inserting the disc. Then, press the [6] key while maintaining the regulator turned off.

③ After the above operations, the new test mode remains on irrespective of whether the S-CD is turned on or off. You can reset the new test mode by turning on the reset start.

* With some products, the new test mode can be reset through the same operations as that employed for shifting to the STBY mode (while maintaining the Acc turned off).

(2) Key Correspondence

Key	Test mode		New test mode	
	Power Off	Power On	In-play	Error Production
BAND	To power on (offset adjustment performed)	To power off	–	Time/Err.No. switching
►	–	FWD-Kick	FF/TR+	–
◄	–	REV-Kick	REV/TR-	–
1	–	T.Close (AGC performed) /parameter display switching	Scan	–
2	RF AMP gain switching	Parameter display switching /T.BAL adjustment/T.Open	Mode	–
3	To power on (offset adjustment not performed)	F.Close/RF AGC/F.T.AGC	–	–
6	–	F.Mode switching /T.Close (no AGC)/Jump switching	Auto/Manu	T.No./Time switching

Note: Eject and CD on/off is performed in the same procedure as that for the normal mode.

(3) Cause of Error and Error Code

Code	Class	Contents	Description and cause
40	Electricity	Off focus detected.	FOK goes low. → Damages/stains on disc, vibrations or failure on servo.
41	Electricity	Spindle unlocked.	FOK = Low continued for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
42	Electricity	Sub-code unreadable.	Sub-code was unreadable for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
43	Electricity	Sound skipping detected.	Last address memory function was activated. → Damages/stains on disc, vibrations or failure on servo.

Note: Mechanical errors during aging are not displayed.

The error codes should be indicated in the same way as in the normal mode.

(4) Display of Operational Status (CPOINT) during Setup

Status No.	Contents	Protective action
00	CD+5V ON process in progress.	None
01	Servo LSI initialization (1/3) in progress.	None
02	Servo LSI CRAM initialization in progress.	None
03	Servo LSI initialization (2/3) in progress.	None
04	Offset adjustment (1/3) in progress.	None
05	Offset adjustment (2/3) in progress.	None
06	Offset adjustment (3/3) in progress.	None
07	FZD adjustment in progress.	None
08	Servo LSI initialization (3/3) in progress.	None
10	Carriage move to home position started.	None
11	Carriage move to home position started.	None
12	Carriage is moving toward inner diameter.	Specified 10 seconds has been passed or failure on home switch.
13	Carriage is moving toward outer diameter.	Specified 10 seconds has been passed or failure on home switch.
14	Carriage outer kick in progress.	None
15	Carriage outer diameter feed (1 second) in progress.	None
20	Servo close started.	None
21	Pre-processing for focus search started.	None
22	Spindle rotation and focus search started.	None
23	Waiting for focus close (XSI=Low).	Specified focus search time has been passed.
24	Standing by after focus close is over.	Specified focus search time has been passed.
25	Focus search preprocessing is in progress while setup protection is turned on.	None
26	Focus search preprocessing is in progress while focus recovery is turned on.	None
27	Wait time after focus close is set up.	Off focus.
28	Standing by after focus close is over.	Off focus.
29	Setup (1/2) before T balance adjustment is started.	Off focus.
30	Setup (2/2) before T balance adjustment is started.	Off focus.
31	T balance adjustment started.	Off focus.
32	T balance adjustment (1/2).	Off focus.
33	T balance adjustment (2/2).	Off focus.
34	Waiting for spindle rotation to end. Spindle rough servo.	Off focus.
35	Standing by after spindle rough servo is over.	Off focus.
36	RF AGC started.	Off focus.
37	RF AGC started.	Off focus.
38	RF AGC ending process in progress.	Off focus.
39	Tracking close in progress.	Off focus.
40	Standing by after tracking is closed. Carriage closing in progress.	Off focus.
41	Focus/tracking AGC started.	Off focus.
42	Focus AGC started.	Off focus.
43	Focus AGC in progress.	Off focus.
44	Tracking AGC in progress.	Off focus.
45	Standing by after focus/tracking AGC are over.	Off focus.
46	Spindle processes applicable servo.	Off focus.
47	Check for servo close is started.	Off focus.
48	Check of LOCK pin started.	Off focus or spindle not locked.
49	RF AGC started.	Off focus.
50	RF AGC in progress.	Off focus.
51	Standing by after RF AGC is over.	Off focus.

(5) Display Examples

1) During Setup (When status no. = 11)

TRK No.	MIN.	SEC.
11	11'	11"

2) During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

3) When a Protection Error Occurred

Switch to the following displays (A) and (B) using the [BAND] switch:

(A) Error occurrence timing display in absolute time.

An example: Error occurred in 12th tune at 34'56" in absolute time.

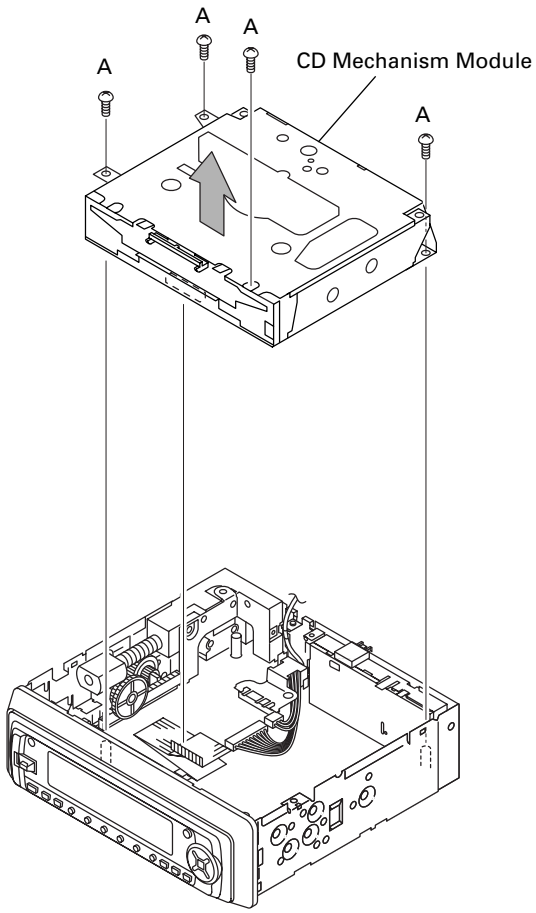
TRK No.	MIN.	SEC.
12	34'	56"

(B) Error No. display

An example: Error #40 (Off focus is detected)

ERROR-40

7.1.2 DISASSEMBLY

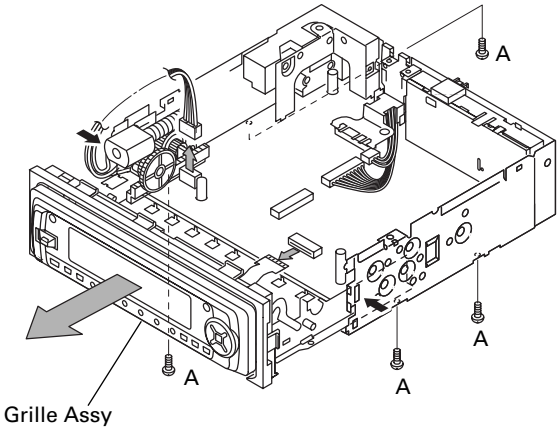


● Removing the Case (Not shown)

1. Remove the two screws, and then remove the Case.

● Removing the CD Mechanism Module

1. Remove the four screws A.
2. Disconnect the connector, and then remove the CD Mechanism Module.

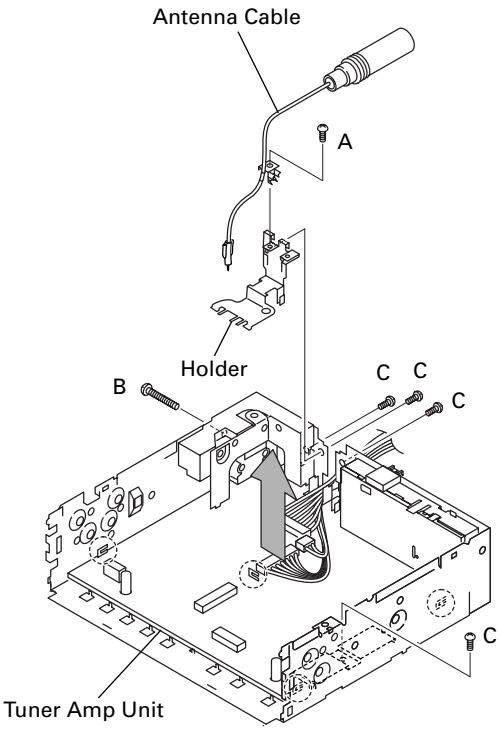


● Removing the Tuner Amp Unit (1/2)

1. Disconnect the two connectors.
2. Remove the four screws A.
3. Disconnect the two stoppers indicated by arrows, and then remove the Grille Assy.

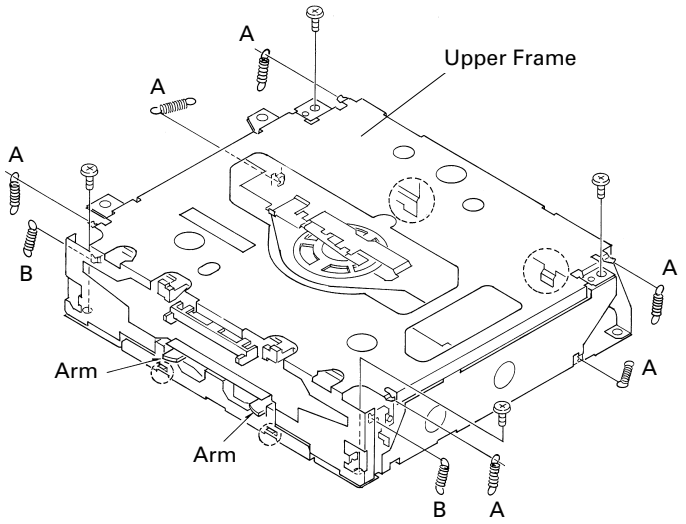
● **Removing the Tuner Amp Unit (2/2)**

1. Remove the screw A, four screws C, and then remove the Antenna Cable and Holder.
2. Remove the screw B.
3. Stretch the four tabs, and then remove the Tuner Amp Unit.



● Removing the Upper Frame

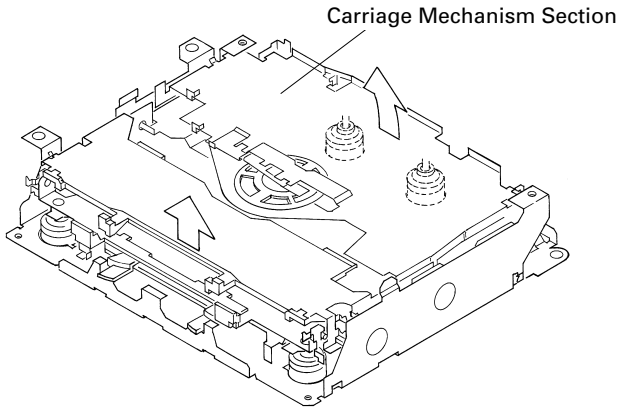
1. Remove six Springs A, two Springs B and four Screws.
2. Remove two Tabs situated on rear side of the Upper Frame, remove two Arms on the front side, then remove two Tabs on the front side.



● Removing the Carriage Mechanism

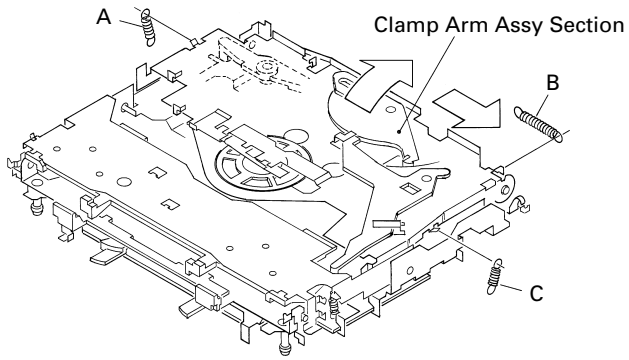
1. Disengage the Carriage Mechanism from the two dampers situated in the front side by driving it up, then disengage and remove the mechanism from the two dampers by driving it up aslant into front side direction.

Note : When assembling the Carriage Mechanism, coat the dampers with alcohol prior to the assembly.



● Removing the Clamp Arm Assy

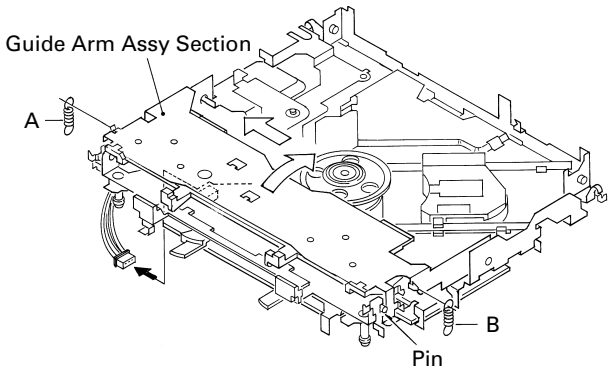
1. Remove a Spring A, a B and a Spring C.
2. Drive the Clamp Arm Assy up into rear side direction, then disengage the arm from its current position Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward right side to remove it.



● Removing the Guide Arm Assy

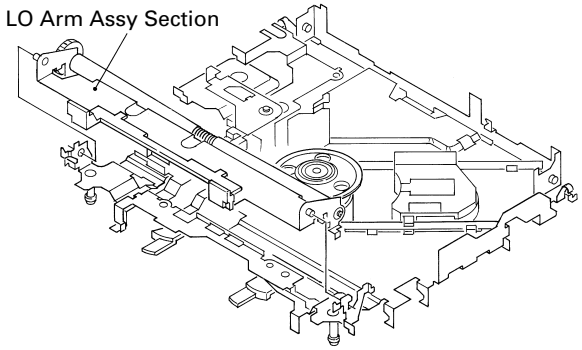
1. Remove a connector, a spring A and B
2. Drive the Guide Arm Assy up aslant into rear side direction, then remove it from a Pin. Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward left side to remove it.

Note : When assembling the guide arm assembly, route the cord inside the assembly. In this operation, care must be exercised so that cord may be caught by the gear.



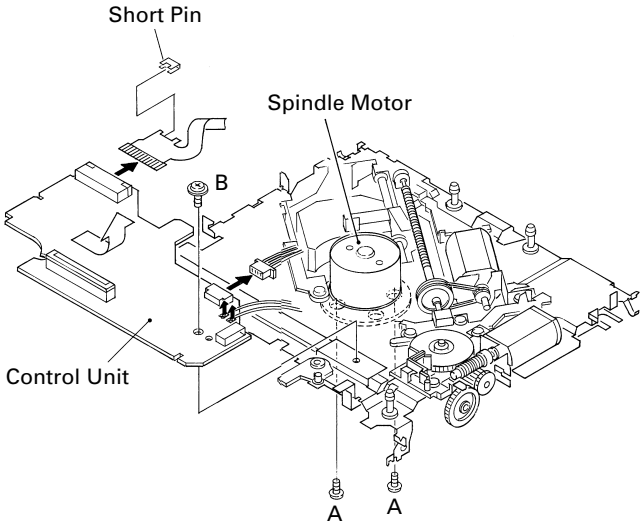
● Removing the LO Arm Assy

1. Remove two Pins to dismount the LO Arm Assy.



● Removing the Control Unit and the Spindle Motor

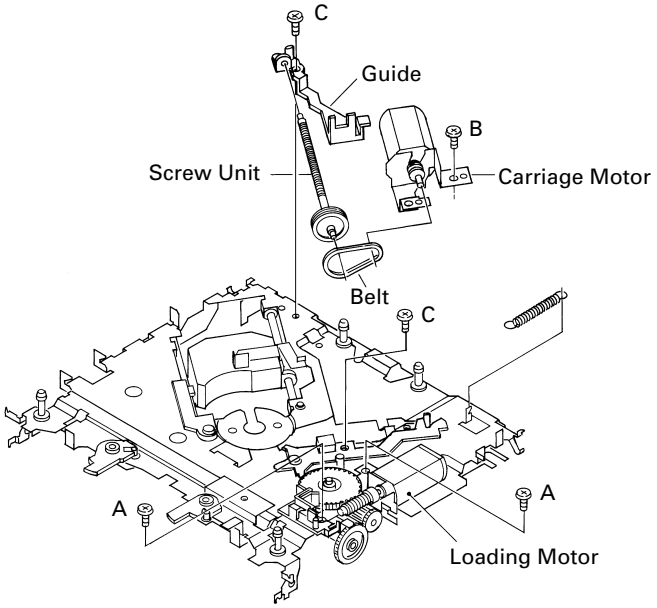
1. Remove from the connector after mounting the short pin on the flexible PCB of the pickup unit.
2. Remove two Soldered joints, then remove two Screws A.
3. Remove two connectors and a Screw B.
4. Disengage the Control Unit from two Tabs, then dismount the unit by sliding it toward left.
5. Dismount the Spindle Motor.



● Removing the Loading Motor and Carriage Motor

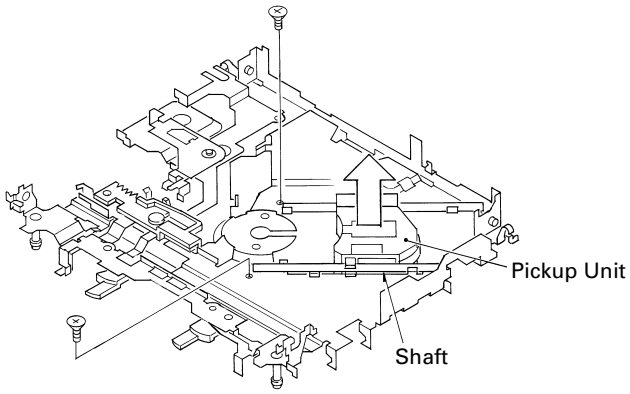
1. Remove the Spring and two Screws A.
2. Dismount the Loading Motor.
3. Remove the Belt, a Screw B, two Screws C, a Guide and a Screw Unit.
4. Dismount the Carriage Motor.

Note : When assembling the Belt, use care so that it may not be contaminated by grease.



● Removing the Pickup Unit

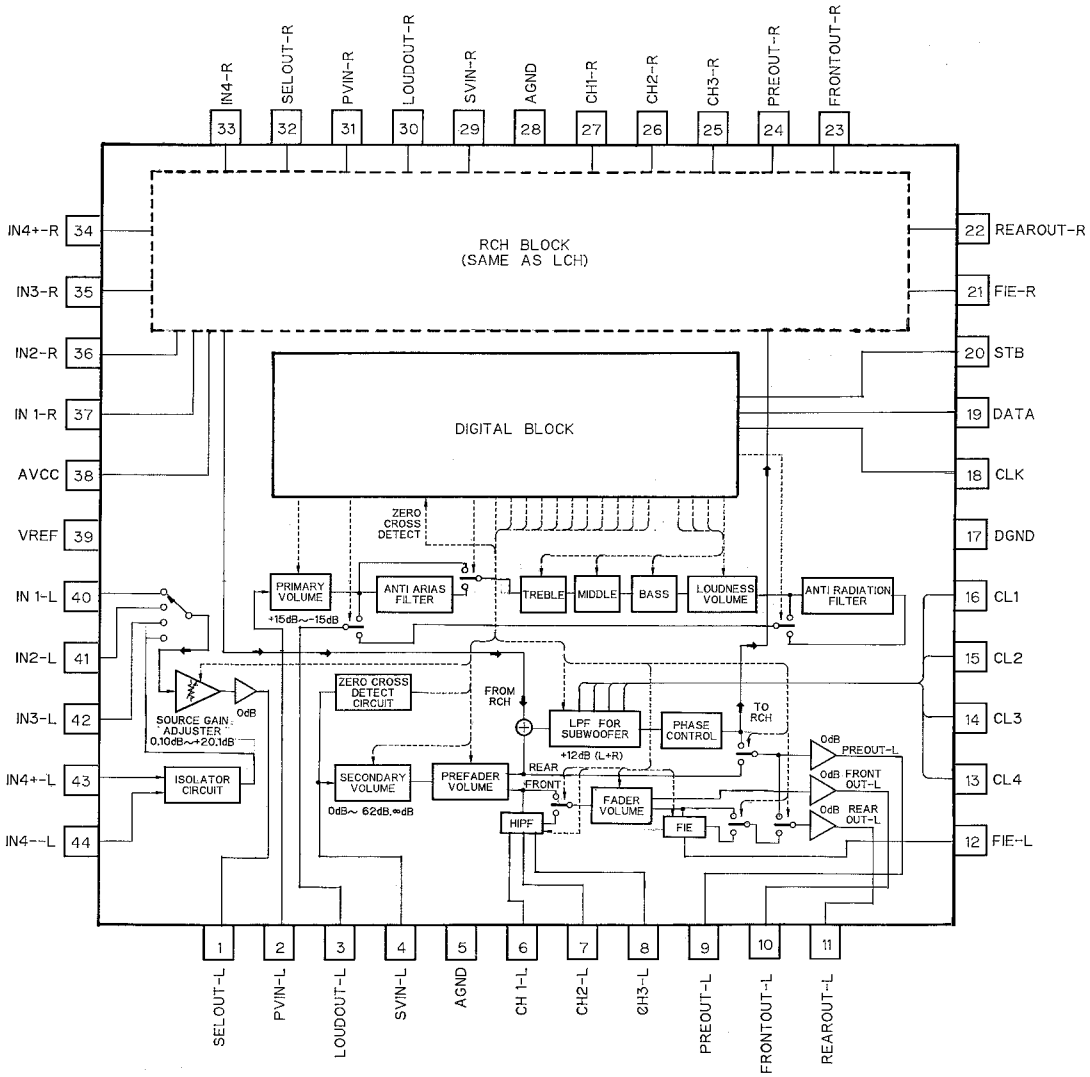
1. Remove two Screws and a Shaft.
2. Dismount the Pickup Unit.



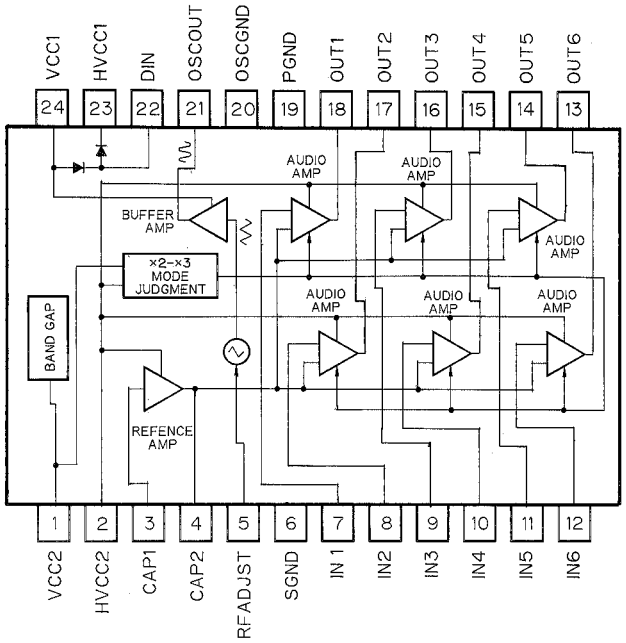
7.2 IC

PML004AF	PD5486A	UPD63710GC
PA2028A	BA6288FS	BA5985FM
PAL005A	BR9010FV	PE5011C
S-81250SGUP	PD5471A	
PM4009A	PD8051A	

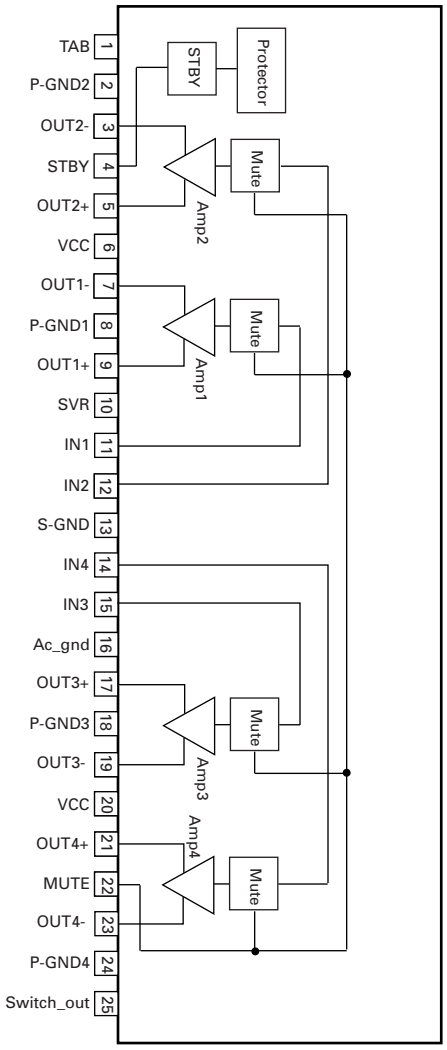
PML004AF



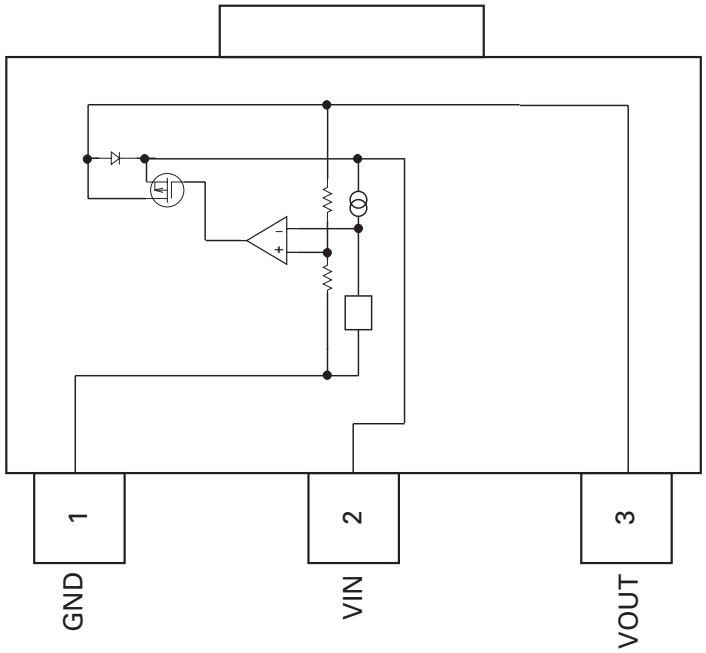
PA2028A



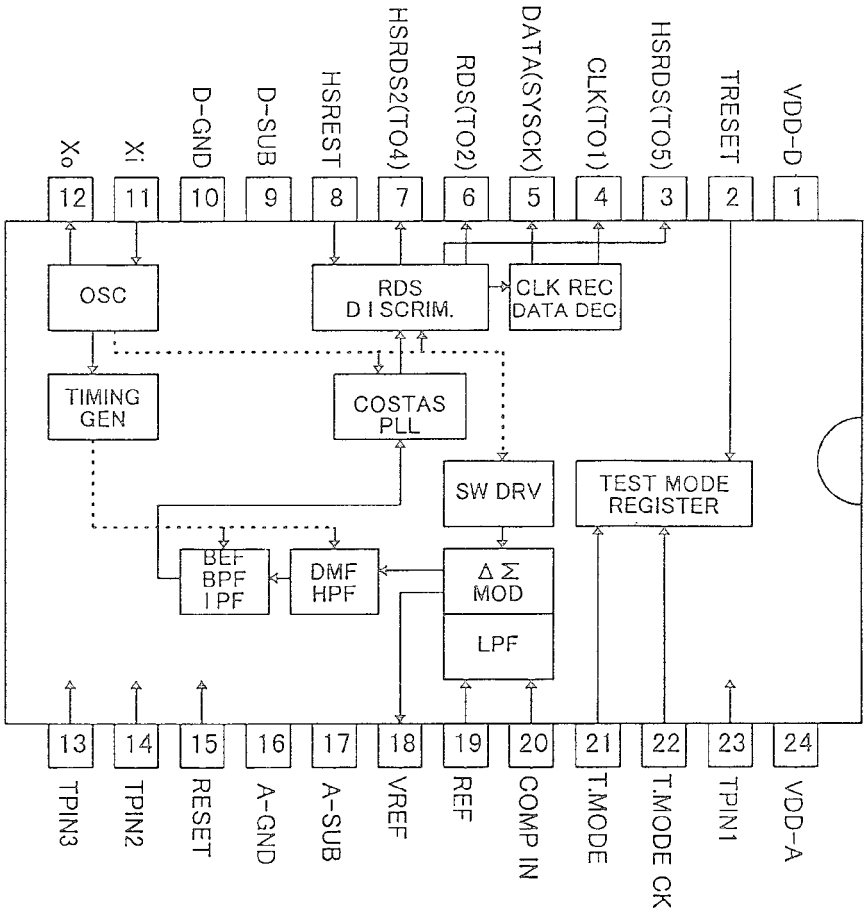
PAL005A



S-81250SGUP



PM4009A

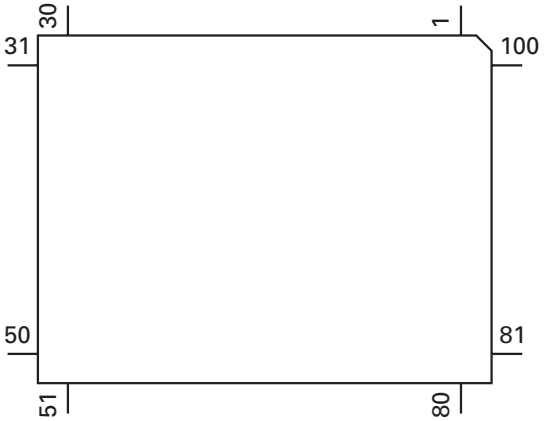


● **Pin Functions (PD5486A)**

Pin No.	Pin Name	I/O	Function and Operation
1	TUNPDO	O	PLL data output
2	TUNPCK	O	PLL clock output
3	TUNPCE	O	PLL chip enable output
4	TUNPCE2	O	PLL chip enable output 2
5,6	NC		Not used
7	IPPW	O	IP-BUS power supply control output
8,9	VSS1,2		GND
10	ASENBO	O	IP-BUS slave power supply control output
11	TELIN	I	Cellular mute input
12	RESET	I	Reset input
13	OSC1	O	Oscillator connection pin 1
14	VSS3		GND
15	OSC2	O	Oscillator connection pin 2
16	VCC1		5V
17	NMI	I	Pull up
18	$\overline{RCK}$	I	RDS clock input
19	$\overline{LDET}$	I	PLL lock sense input
20	NC		Not used
21	RX2	I	IP-BUS data input 2
22	SYSPW	O	System power supply control output
23	ISENS	I	Illumination sense input
24	PEE	O	Beep tone output
25	RDS57K	I	57kHzBP-OUT sense input
26	FLPPW	O	Flap motor driver power ON/OFF output
27	MUTE	O	Mute output
28	NC		Not used
29	RX	I	IP-BUS data input
30	TX	O	IP-BUS data output

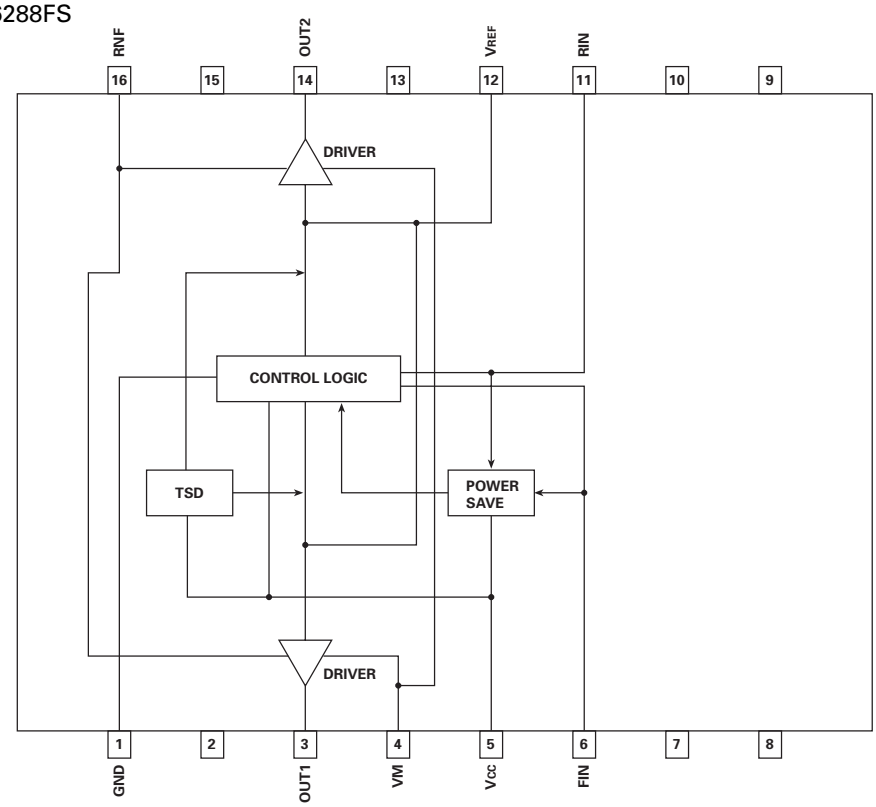
Pin No.	Pin Name	I/O	Function and Operation
31	BSO	O	P-BUS communication data output
32	BSI	I	P-BUS communication data input
33	BSCK	I/O	P-BUS serial clock input/output
34	FLPOPN	O	Flap motor open output
35	DPDT	O	Display serial data output
36	KYDT	I	Display enable data input
37	FLPCLS	O	Flap motor close output
38	FOPENSW	I	Flap open switch input
39	NC		Not used
40	FCLSSW	I	Flap close switch input
41	DLED	O	Alarm LED output
42	NC		Not used
43	FLPILM	O	Inside of flap illumination output
44	ILMPW	O	Illumination power supply control output
45	SWVDD	O	Display chip select output
46	OELPW	O	OEL module power supply control output
47	DSENS	I	Grille detach sense input
48	ST	I	FM stereo input
49	SD	I	SD input
50–61	NC		Not used
62	VCC3		5V
63	NC		Not used
64	VSS4		GND
65	VCK/ROMCLK	O	E-VOL clock output / ROM correction clock output
66	VDT/ROMDATA	O/I	E-VOL data output / ROM correction data input
67	VST	I	E-VOL strobe pulse output
68	NC		Not used
69	BRXEN	I/O	P-BUS communication input/output
70	BRST	O	P-BUS reset output
71	BSRQ	I/O	P-BUS communication request input/output
72	NC		Not used
73	BSENS	I	Back up power sense input
74	ASENS	I	ACC power sense input
75,76	NC		Not used
77	LOCH	O	Local “H” output
78	LOCL	O	Local “L” output
79	NC		Not used
80	ANTFIX	O	Open
81	FM/AM	O	FM/AM power select output
82	TMUTE	O	Tuner mute output
83	DRST	O	RDS decoder reset output
84	RDSLK	I	RDS lock signal input
85	RDT	I	RDS data input
86	DRSENS	I	Door open/close sense input
87	DRSYS	O	Door system select output
88	TESTIN	I	Test mode IN/test enable
89	NL2	I	RDS noise level input 2
90	CURRQ	O	Tuner voltage FIX output
91	LEVELR	I	Level meter "R" AD input
92	LEVELL	I	Level meter "L" AD input
93	NC		Not used
94	SD_BW	I	SD input
95	NL	I	Noise level input
96	VSS5		GND
97	SL	I	Signal level input
98	VREF		A/D converter reference voltage
99	VCC4		5V
100	TUNPDI	I	PLL data input

*PD5486A

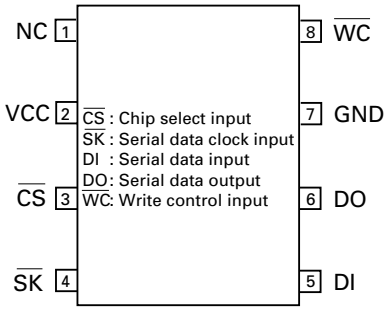


IC's marked by* are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

BA6288FS



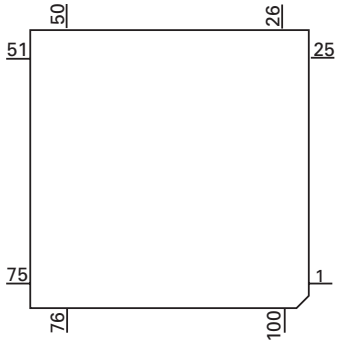
BR9010FV



● **Pin Functions (PD5471A)**

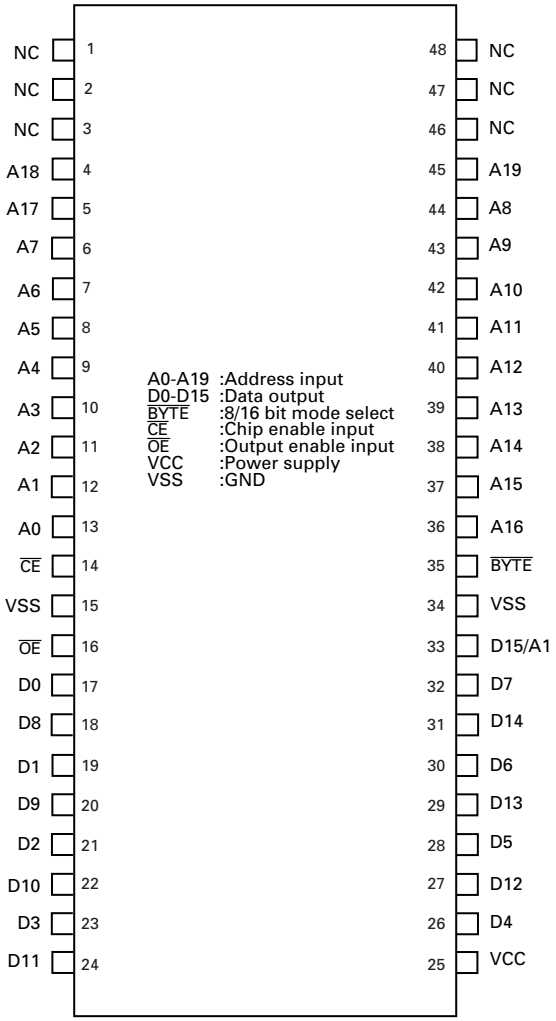
Pin No.	Pin Name	I/O	Format	Function and Operation
1–4	NC			Not used
5	REM	I		Remote control reception
6	BYTE	I		External data BUS width select input
7	CNVSS	I		Processor mode select input
8,9	NC			Not used
10	$\overline{\text{RESET}}$	I		Reset input
11	XOUT	O		Crystal oscillating element connection pin
12	VSS			GND
13	XIN	I		Crystal oscillating element connection pin
14	VDD			VDD
15	$\overline{\text{NMI}}$	I		NMI input
16	NC			Not used
17–20	$\overline{\text{KD}}$1-4	I		Key data 1-4
21–26	$\overline{\text{KS}}$1-6	I/O		Key strobe input/output 1-6
27–31	NC			Not used
32	ILMD	O	C	Dual illumination
33	KYDT	O	C	Key data output
34	DPDT	I		Display data input
35	NC			Not used
36	OEL	O	C	OEL controller ON
37	$\overline{\text{RDY}}$	I		OEL controller ready input
38	NC			Not used
39	$\overline{\text{HOLD}}$	I		Hold input
40,41	NC			Not used
42	$\overline{\text{RD}}$	O	C	Read strobe
43	NC			Not used
44	$\overline{\text{WR}}$	O	C	Write strobe
45	NC			Not used
46	$\overline{\text{CS}}$2	O	C	Bank address (High)
47	$\overline{\text{CS}}$1	O	C	Bank address (Low)
48	$\overline{\text{CS}}$0	O	C	External ROM chip select
49	A19	O	C	Address bus Output
50	NC			Not used
51-59	A17-9	O	C	Address bus Output
60	VDD			VDD
61	A8	O	C	Address bus Output
62	VSS			GND
63–69	A7-1	O	C	Address bus Output
70	NC			Not used
71–86	D15-0	I/O		Data bus input/output
87–93	NC			Not used
94	AVSS			Connect to VSS
95	NC			Not used
96	VREF			Connect to VSS
97	AVCC			Connect to VCC
98-100	NC			Not used

*PD5471A



Format	Meaning
C	C MOS

PD8051A

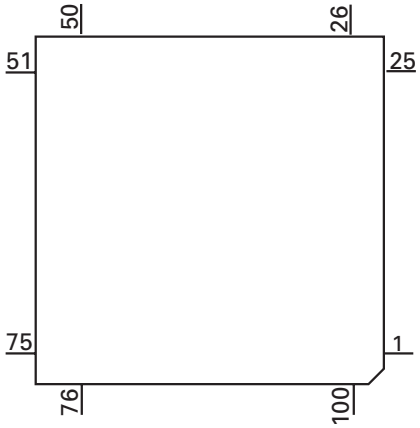

NC 1
NC 2
NC 3
A18 4
A17 5
A7 6
A6 7
A5 8
A4 9
A3 10
A2 11
A1 12
A0 13
CE 14
VSS 15
OE 16
D0 17
D8 18
D1 19
D9 20
D2 21
D10 22
D3 23
D11 24
48 NC
47 NC
46 NC
45 A19
44 A8
43 A9
42 A10
41 A11
40 A12
39 A13
38 A14
37 A15
36 A16
35 BYTE
34 VSS
33 D15/A1
32 D7
31 D14
30 D6
29 D13
28 D5
27 D12
26 D4
25 VCC
A0-A19 :Address input
D0-D15 :Data output
BYTE :8/16 bit mode select
CE :Chip enable input
OE :Output enable input
VCC :Power supply
VSS :GND

● **Pin Functions (UPD63710GC)**

Pin No.	Pin Name	I/O	Function and Operation
1	GND		Logic circuit GND
2	HOLD	I/O	Defect detection output
3	MIRR	I/O	MIRR output
4	FOK	O	RFOK signal output
5	$\overline{\text{RST}}$	I	Reset signal input
6	A0	I	Command/parameter identification signal input
7	$\overline{\text{STB}}$	I	Data strobe signal input
8	$\overline{\text{SCK}}$	I	Clock signal input for serial data input/output
9	SO	O	Serial data and status signal output
10	SI	I	Serial data input
11	VDD		Positive power supply terminal to logic circuit
12	DA.VDD		Positive power supply terminal to D/A converter
13	NC		Not used
14, 15	DA.GND		D/A converter GND
16	NC		Not used
17	DA.VDD		Positive power supply terminal to D/A converter
18	R+	O	Right channel audio data output
19	R-	O	Right channel audio data output
20	L-	O	Left channel audio data output
21	L+	O	Left channel audio data output
22	X.VDD		Positive power supply terminal to crystal oscillation circuit
23	$\overline{\text{XTAL}}$	O	Crystal oscillator connect pin
24	XTAL	I	Crystal oscillator connect pin
25	X.GND		Crystal oscillation circuit GND
26	VDD		Positive power supply terminal to logic circuit
27	EMPH	O	Output pin for the pre-emphasis data in the sub-Q code
28	FLAG	O	Flag output pin to indicate that audio data currently being output consists of noncorrectable data
29	DIN	I	Serial data input to internal DAC
30	DOUT	O	Serial audio data output
31	SCKIN	I	Serial clock input to internal DAC
32	SCKO	O	Audio data that is output from DOUT changes at rising edge of this clock
33	LRCKIN	I	LRCK signal input to internal DAC
34	LRCK	O	Signals to distinguish the right and left channels of the audio data output from DOUT
35	WDCK	O	Output double the frequency of LRCK
36	TX	O	Digital audio interface data output
37	GND		Logic circuit GND
38	C16M	O	Oscillator clock buffering output
39	LIMIT	I	Status of the pin is output at Bit 5 of the status output
40	VDD		Positive power supply terminal to logic circuit
41	LOCK	O	EFM synchronous detection signal
42	RFCK	O	Frame synchronous signal of XTAL-system
43	WFCK	O	Frame synchronous signal of PLL-system
44	PLCK	O	Monitor pin of bit clock
45	GND		Logic circuit GND
46	C1D1	O	Output pin for indicating the C1 error correction results
47	C1D2	O	Output pin for indicating the C1 error correction results
48	C2D1	O	Output pin for indicating the C2 error correction results
49	C2D2	O	Output pin for indicating the C2 error correction results
50	C2D3	O	Output pin for indicating the C2 error correction results
51	VDD		Positive power supply terminal to logic circuit
52	PACK	O	CD-TEXT PACK synchronous signal
53	TSO	O	CD-TEXT data serial output
54	TSI	I	CD-TEXT control parameter serial input
55	$\overline{\text{TSCK}}$	I	CD-TEXT serial clock input
56	TSTB	I	CD-TEXT parameter strobe signal input
57	GND		Logic circuit GND
58	TEST	I	Test pin

Pin No.	Pin Name	I/O	Function and Operation
59	ATEST	I/O	Test pin
60	RFMODE	I	Use/not use select for internal RF amplifier
61	A.GND		Analog circuit GND
62	FD	O	Focus drive output
63	TD	O	Tracking drive output
64	SD	O	Sled drive output
65	MD	O	Spindle drive output
66	DACO	O	DAC output for adjustment
67	FBAL	O	DAC output for adjustment
68	TBAL	O	DAC output for adjustment
69	TEVCA	O	DAC output for adjustment
70	A.VDD		Power supply terminal to analog circuit
71	EFM	O	EFM signal output
72	ASY	I	EFM comparator reference voltage input
73	C3T		3T detection capacitor additional pin
74	RFI	I	RF signal input for EFM data regulation
75	AGCO	O	RF signal output of after gain adjustment
76	AGCI	I	RF-AGC amplifier input
77	RFO	O	RF summing amplifier output
78	EQ2		RF amplifier equalizer parts additional pin
79	EQ1		RF amplifier equalizer parts additional pin
80	RF-	I	RF summing amplifier inverted input
81	A.GND		Analog circuit GND
82	A	I	Photo detector A input
83	C	I	Photo detector C input
84	B	I	Photo detector B input
85	D	I	Photo detector D input
86	F	I	Photo detector F input
87	E	I	Photo detector E input
88	A.VDD		Positive power supply terminal to analog circuit
89	REFOUT	O	Reference electric potential output
90	FE-	I	Focus error amplifier inverted input
91	FEO	I/O	Focus error amplifier output
92	TE-	I	Tracking error amplifier inverted input
93	TEO	I/O	Tracking error amplifier output
94	TE2	I/O	Tracking error output of after amplification
95	TEC	I	Tracking comparator input
96	A.GND		Analog circuit GND
97	PD	I	PD detection signal input for LD output monitor
98	LD	O	LD control current output
99	PN	I	APC circuit control polarity set pin
100	A.VDD		Positive power supply terminal to analog circuit

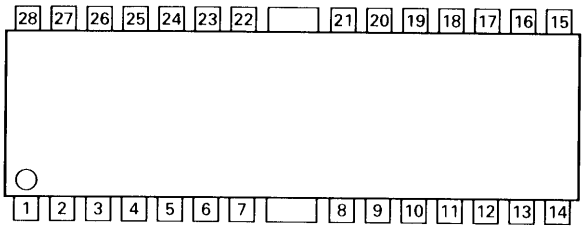
*UPD63710GC



● **Pin Functions (BA5985FM)**

Pin No.	Pin Name	I/O	Function and Operation
1	FWD	I	Loading driver FWD input
2	OPIN1(+)	I	CH1 pre-amplifier input
3	OPIN1(–)	I	CH1 pre-amplifier inverted input
4	OPOUT1	O	CH1 pre-amplifier output
5	OPIN2(+)	I	CH2 pre-amplifier input
6	OPIN2(–)	I	CH2 pre-amplifier inverted input
7	OPOUT2	O	CH2 pre-amplifier output
8	VCC		Power supply
9	VOL(–)	O	Loading driver negative output
10	VOL(+)	O	Loading driver positive output
11	VO2(–)	O	Driver CH2 negative output
12	VO2(+)	O	Driver CH2 positive output
13	VO1(–)	O	Driver CH1 negative output
14	VO1(+)	O	Driver CH1 positive output
15	VO4(+)	O	Driver CH4 positive output
16	VO4(–)	O	Driver CH4 negative output
17	VO3(+)	O	Driver CH3 positive output
18	VO3(–)	O	Driver CH3 negative output
19	GND		GND
20	BIAS	I	Bias input
21	MUTE		Mute control
22	OPOUT3	O	CH3 pre-amplifier output
23	OPIN3(–)	I	CH3 pre-amplifier inverted input
24	OPIN3(+)	I	CH3 pre-amplifier input
25	OPOUT4	O	CH4 pre-amplifier output
26	OPIN4(–)	I	CH4 pre-amplifier inverted input
27	OPIN4(+)	I	CH4 pre-amplifier input
28	REV	I	Loading driver REV input

BA5985FM

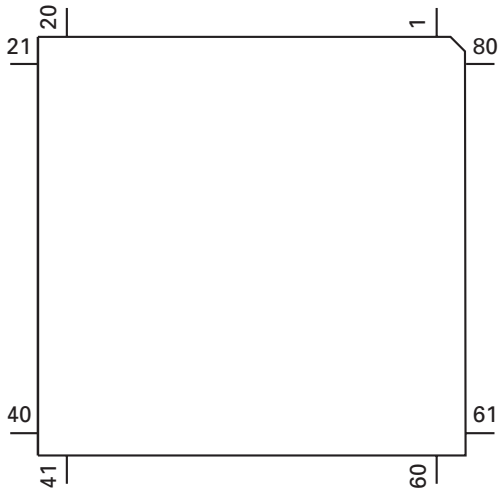


● **Pin Functions(PE5011C)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	EJTSNS			Disc eject position sense input
2	DSCSNS			Disc insert position sense input
3	VDSENS			VD power supply short sense input
4	TEMP			Temperature sense input
5-8	NC			Not used VSS
9	AVREF			A/D reference voltage input
10	$\overline{\text{RESET}}$	I		System reset input
11	XT1	I		VDD
12	XT2			Open
13	IC(VPP)			VSS
14	X1	I		Main clock radiator(8.38MHz)connection
15	X2			Main clock radiator(8.38MHz)connection
16	VDD			Power supply(+5V)
17	VSS			GND
18	$\overline{\text{XSCK}}$	O	C	CD LSI serial clock output
19	XSO	O	C	CD LSI serial data output
20	XSI	I		CD LSI serial data input
21	$\overline{\text{BRST}}$			P-Bus reset input
22	$\overline{\text{PACK}}$			CD-TEXT pack sync signal input
23, 24	NC			Not used Open
25	XA0	O	C	CD LSI data discrimination control signal output
26	$\overline{\text{XSTB}}$	O	C	CD LSI strobe output
27	$\overline{\text{XRST}}$	O	C	CD LSI reset output
28	FOK	I		Focus OK input
29	MIRR	I		Specular surface detection input
30	LOCK	I		Spindle lock input
31	CD5VON	O	C	CD +5V power supply control output
32, 33	NC			Not used Open
34	EMPH	O	C	Emphasis information output
35-44	NC			Not used Open
45	VSS			GND
46	VDD			Power supply(+5V)
47	$\overline{\text{ADENA}}$	O	C	A/D reference voltage supply control output
48	VDCONT	O	C	VD power supply control output
49	NC			Not used Open
50	$\overline{\text{CSENS}}$	I		Flap close sense input
51	BRXEN	I/O	/C	Input/output by which P-Bus can be received
52	$\overline{\text{BSRQ}}$	O	C	P-Bus polling request output
53, 54	NC			Not used Open
55	CONT	O	C	Servo driver power supply control output
56	CDMUTE	O	C	CD mute control output
57	CDEJET	O	C	Load/Eject motor Eject control output
58	CDLOAD	O	C	Load/Eject motor Load control output
59	BMUTE	O	C	Bus mute output
60	$\overline{\text{CLAMP}}$	I		Disc clamp input
61, 62	NC			Not used Open
63-66	NC			Not used VDD or VSS
67	TXARI	I		Tx output set selection input
68	$\overline{\text{FSCK}}$	O	C	Flash writing clock input(Open)
69	FTXD	O	C	Flash writing data output(Open)
70	FRXD	O	C	Flash writing data input(Open)
71	$\overline{\text{BSCK}}$	I/O	/C	P-Bus serial clock input/output
72	BDATA	I/O	/C	P-Bus serial data input/output
73	$\overline{\text{TESTIN}}$	I		Test program start input
74	NC			Not used Open
75	TSTB	O	C	CD-TEXT strobe output
76	NC			Not used Open

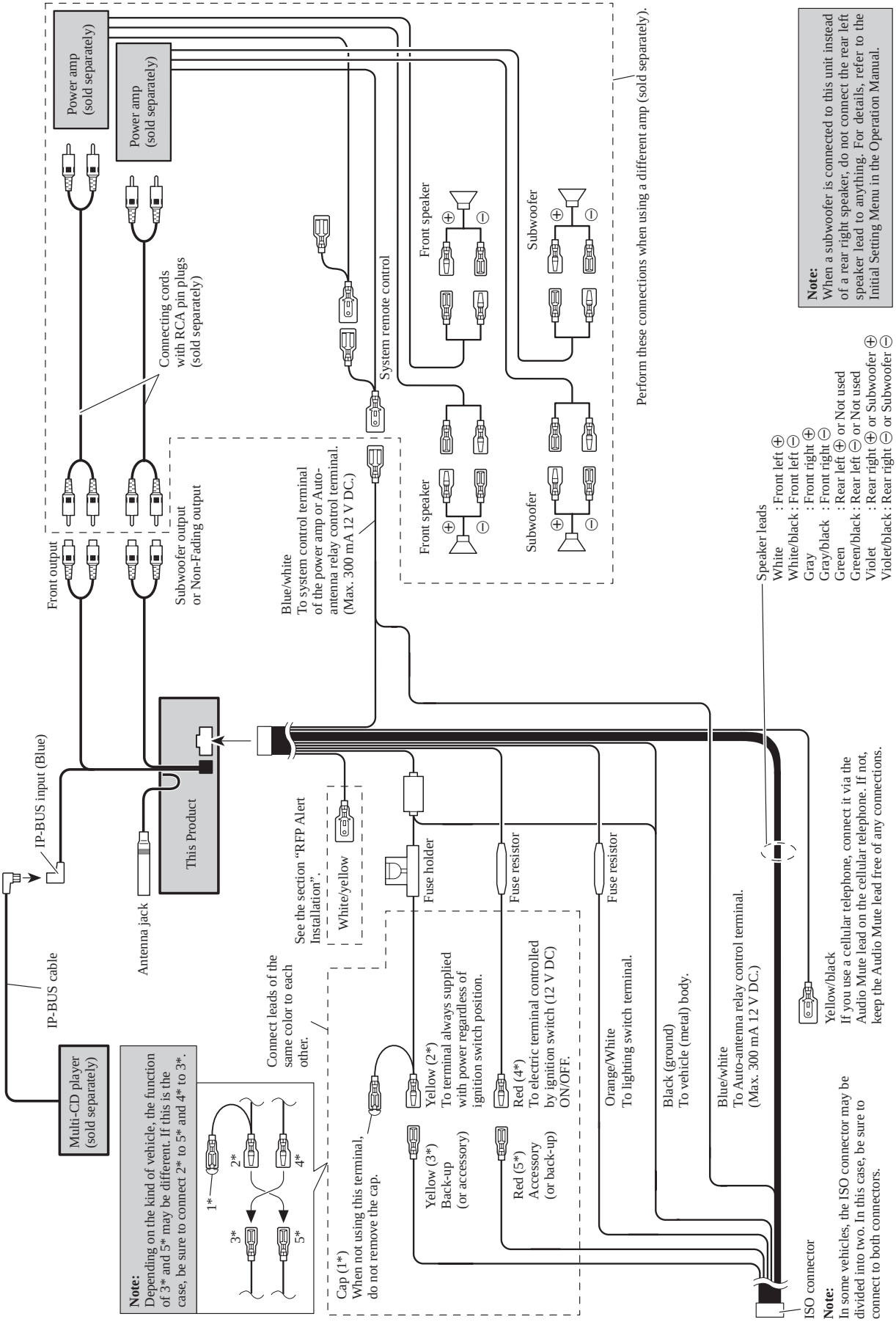
Pin No.	Pin Name	I/O	Format	Function and Operation
77	$\overline{\text{TSCK}}$	O	C	CD-TEXT serial clock output
78	TSO	O	C	CD-TEXT serial data output
79	TSI	I		CD-TEXT serial data input
80	AVSS			A/D GND

*PE5011C

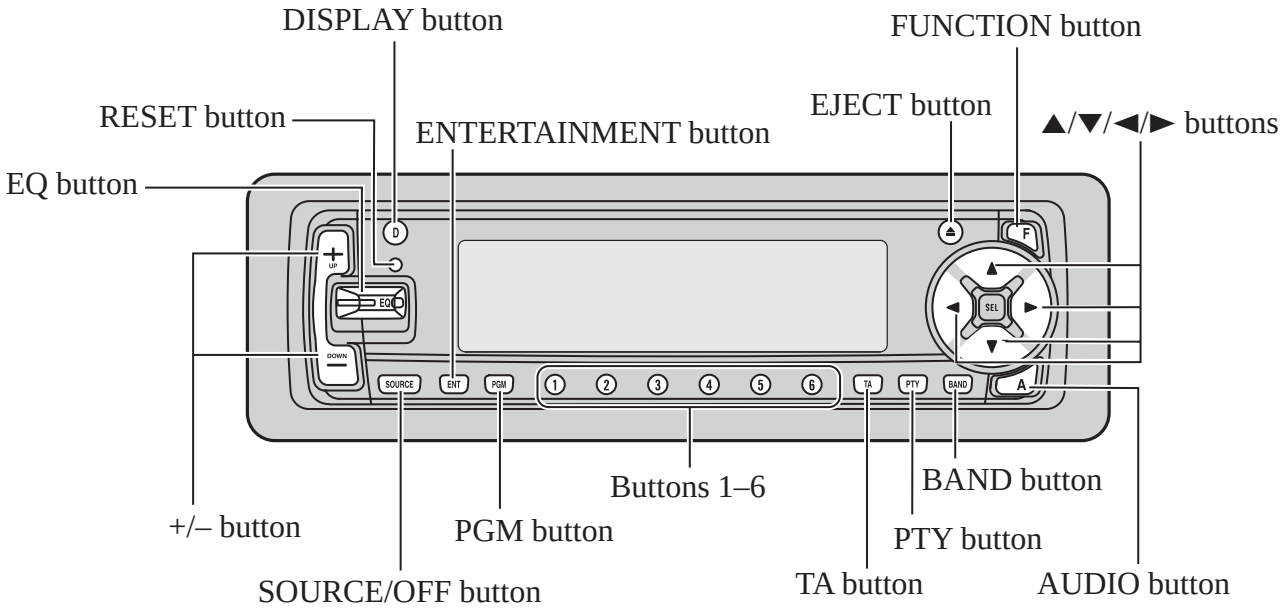


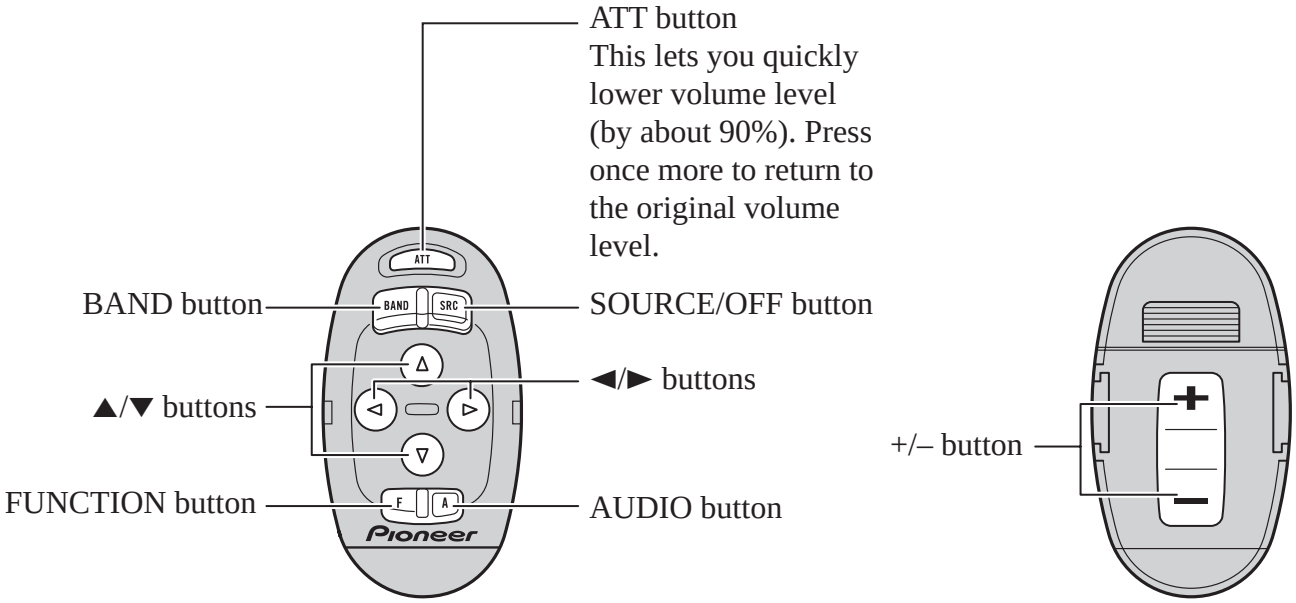
8. OPERATIONS AND SPECIFICATIONS

● Connection Diagram


Power amp (sold separately)
Power amp (sold separately)
Connecting cords with RCA pin plugs (sold separately)
System remote control
Front speaker
Subwoofer
Front speaker
Subwoofer
Perform these connections when using a different amp (sold separately).
Front output
Subwoofer output or Non-Fading output
Blue/white
To system control terminal of the power amp or Auto-antenna relay control terminal.
(Max. 300 mA 12 V DC.)
Speaker leads
White : Front left ⊕
White/black : Front left ⊖
Gray : Front right ⊕
Gray/black : Front right ⊖
Green : Rear left ⊕ or Not used
Green/black : Rear left ⊖ or Not used
Violet : Rear right ⊕ or Subwoofer ⊕
Violet/black : Rear right ⊖ or Subwoofer ⊖
Note:
When a subwoofer is connected to this unit instead of a rear right speaker, do not connect the rear left speaker lead to anything. For details, refer to the Initial Setting Menu in the Operation Manual.
IP-BUS input (Blue)
This Product
Antenna jack
IP-BUS cable
Multi-CD player (sold separately)
See the section "RFP Alert Installation".
White/yellow
Fuse holder
Fuse resistor
Fuse resistor
Connect leads of the same color to each other.
Cap (1*)
When not using this terminal, do not remove the cap.
Yellow (2*)
To terminal always supplied with power regardless of ignition switch position.
Red (4*)
To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
Orange/White
To lighting switch terminal.
Black (ground)
To vehicle (metal) body.
Blue/white
To Auto-antenna relay control terminal.
(Max. 300 mA 12 V DC.)
Yellow (3*)
Back-up
(or accessory)
Red (5*)
Accessory
(or back-up)
1*
2*
3*
4*
5*
Note:
Depending on the kind of vehicle, the function of 3* and 5* may be different. If this is the case, be sure to connect 2* to 5* and 4* to 3*.
Yellow/black
If you use a cellular telephone, connect it via the Audio Mute lead on the cellular telephone. If not, keep the Audio Mute lead free of any connections.
ISO connector
Note:
In some vehicles, the ISO connector may be divided into two. In this case, be sure to connect to both connectors.

8.1 OPERATIONS



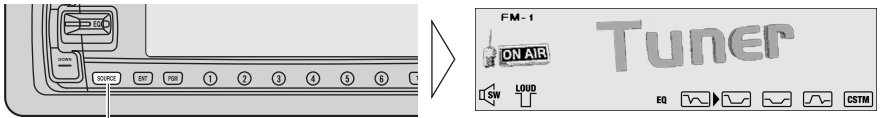

ATT button
This lets you quickly lower volume level (by about 90%). Press once more to return to the original volume level.
BAND button
SOURCE/OFF button
◄/► buttons
▲/▼ buttons
+/– button
FUNCTION button
AUDIO button

To Listen to Music

The following explains the initial of operations required before you can listen to music.

Note:
- Loading a disc in this product.

1. Select the desired source (e.g. Tuner).

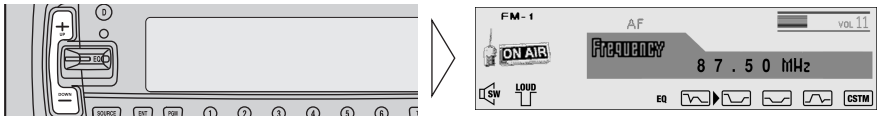


Each press changes the Source ...

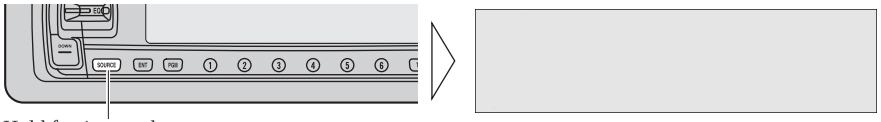
Each press of the SOURCE/OFF button selects the desired source in the following order: Built-in CD player (Compact Disc) → Tuner → DAB (Digital Audio Broadcasting) Tuner → Multi-MD player → Multi-CD player → AUX

Note:
- In the following cases, the sound source will not change:
  * No Multi-CD player is connected to this product.
  * No Multi-MD player is connected to this product.
  * No DAB tuner is connected to this product.
  * No disc is set in this product.
  * No magazine is set in the Multi-CD player.
  * AUX (external input) is set to OFF.

2. Raise or lower the volume.



3. Source OFF.



Hold for 1 second or more

Basic Operation of Tuner

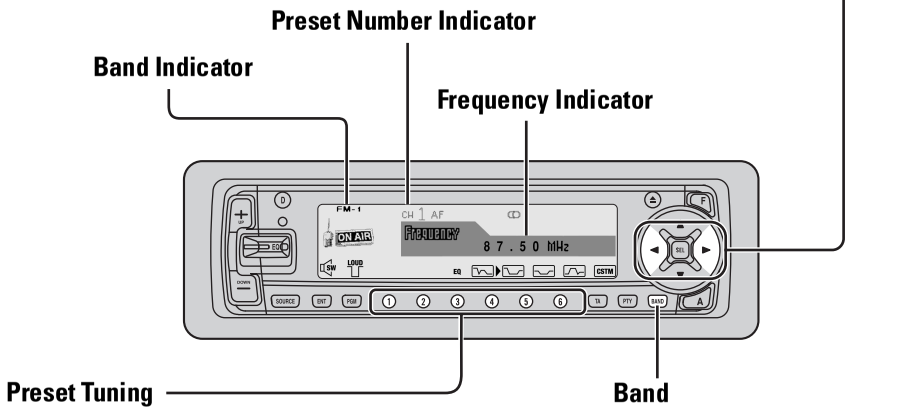
This product's AF function can be switched ON and OFF. AF should be switched OFF for normal tuning operations.

Manual and Seek Tuning

- **You can select the tuning method by changing the length of time you press the ◄/► button.**

Manual Tuning (step by step)	0.5 seconds or less
Seek Tuning	0.5 seconds or more

Note:
- If you continue pressing the button for longer than 0.5 seconds, you can skip broadcast stations. Seek Tuning starts as soon as you stop pressing the button.
- "◯◯" stereo indicator lights when a stereo station is selected.



- **You can memorize broadcast stations in buttons 1 through 6 for easy, one-touch station recall.**

Preset station recall	2 seconds or less
Broadcast station preset memory	2 seconds or more

Note:
- Up to 18 FM stations (6 in FM-1, FM-2 and FM-3) and 6 MW/LW stations can be stored in memory.
- You can also use the ▲ or ▼ buttons to recall broadcast stations memorized in buttons 1 through 6.

Basic Operation of Built-in CD Player

Switching the Display

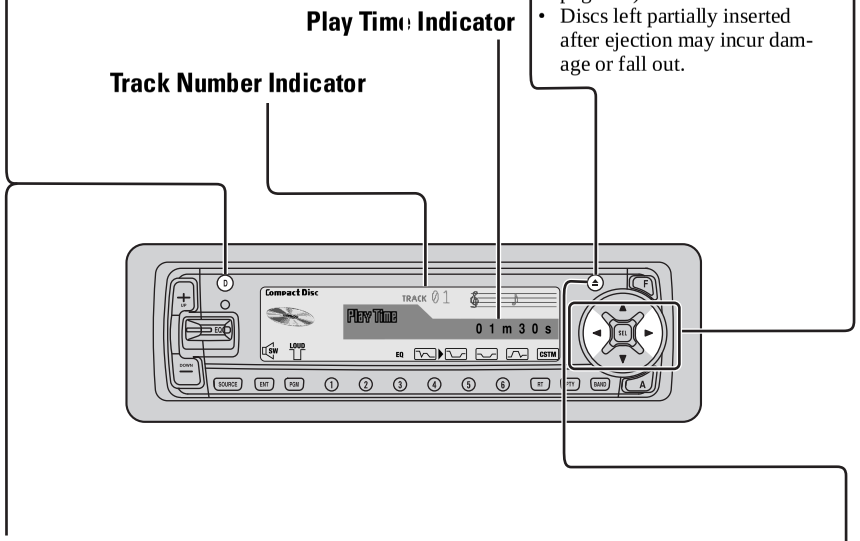
Each press of the DISPLAY button changes the display in the following order:
Play mode (Play Time)
→ Disc Title

Note:
- If you switch displays when disc titles have not been input, “No Title” is displayed.

Eject

Press the EJECT button, and you can open the front panel before ejection.
In case of opening the front panel, you can just eject a CD.

Note:
- The CD function can be turned ON/OFF with the disc remaining in this product. (Refer to page 13.)
- Discs left partially inserted after ejection may incur damage or fall out.



Switching the Display (only for CD TEXT Discs)

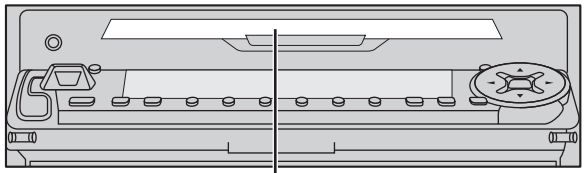
Each press of the DISPLAY button changes the display in the following order:
Play mode (Play Time) → Disc Title → Disc Artist → Track Title → Track Artist
With text longer than 20 letters, you can scroll to see the rest of the text by pressing the DISPLAY button for 2 seconds or more.

Note:
- A CD TEXT disc is a CD featuring recorded text information such as Disc Title, Artist Name and Track Title.
- If you switch a display when the disc titles has not been input, “No Title” is displayed.
- If you switch a display when the disc artists has not been input, “No Artist Name” is displayed.
- If you switch a display when the track titles has not been input, “No Title” is displayed.
- If you switch a display when the track artists has not been input, “No Artist Name” is displayed.

Track Search and Fast Forward/Reverse

- **You can select between Track Search or Fast Forward/Reverse by pressing the ◄/► button for a different length of time.**

Track Search	0.5 seconds or less
Fast Forward/Reverse	Continue pressing



Disc Loading Slot

If a CD is inserted, the front panel is closed automatically.
The Built-in CD player plays one standard 12 cm or 8 cm (single) CD at a time. Do not use an adapter when playing 8 cm CD.

Note:
- If a disc cannot be inserted fully or playback fails, make sure the recorded side is down. Push the EJECT button and check the disc for damage before reinserting it.
- If the Built-in CD player cannot operate properly, an error message (such as “ERROR-14”) appears on the display. Refer to “Built-in CD Player’s Error Message”.

Open

Press the EJECT button for 1 second or more, and you can open the front panel without ejecting a CD.
In case of opening the front panel, you can close it.

Note:
- When opening the front panel, the 1 to 6 buttons are not available.

⚠ WARNING:
- Do not use with the front panel left open. If you do leave it open, it may result in injury in the event of an accident.

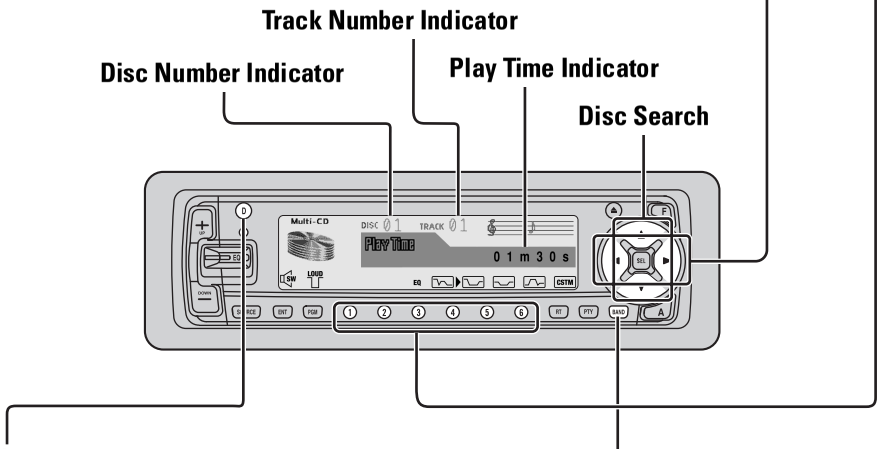
Basic Operation of Multi-CD Player

This product can control a Multi-CD player. (With certain old type Multi-CD players, using a multiple connection adapter lets you connect multiple units which you can control with this product.)

Track Search and Fast Forward/Reverse

- **You can select between Track Search or Fast Forward/Reverse by pressing the ◄/► button for a different length of time.**

Track Search	0.5 seconds or less
Fast Forward/Reverse	Continue pressing



Switching the Display

Each press of the DISPLAY button changes the display in the following order:
Play mode (Play Time)
→ Disc Title

Note:
- If you switch displays when disc titles have not been input, “No Title” is displayed.

Switching the Multi-CD Player

When two or more Multi-CD players are connected using a multiple connection adapter, you can select the Multi-CD player by pressing the BAND button.

Magazine 1 → Magazine 2
→ Magazine 3
(Displayed about for 2 seconds.)

Disc Number Search (for 6-Disc, 12-Disc types)

- **You can select discs directly with the 1 to 6 buttons. Just press the number corresponding to the disc you want to listen to.**

Note:
- When a 12-Disc Multi-CD Player is connected and you want to select disc 7 to 12, press the 1 to 6 buttons for 2 seconds or longer.

Disc Number Rough Search (for 50-Disc type only)

This handy function lets you select discs loaded in a 50-Disc Multi-CD Player using the 1 to 5 buttons. The 50 discs are divided into five blocks, with each of the 1 to 5 buttons assigned to a block.

- **Select the desired block with the 1 to 5 buttons.**

Note:
- After completing a rough search, use the ▲ and ▼ buttons to select a desired disc.

Note:
- The Multi-CD player may perform a preparatory operation, such as verifying the presence of a disc or reading disc information, when the power is turned ON or a new disc is selected for playback. “READY” is displayed.
- When a magazine is loaded into a 50-Disc type Multi-CD Player, information on all the discs in the magazine is read.
  If you start playing a disc on a 50-Disc type Multi-CD Player before reading of information on all discs has been completed, reading of information stops part way through. This will prevent you from using the ITS function. (If you try and use this function, “Not Ready” is displayed.)
  If this happens, reading of information begins again when you switch to a component other than the 50-Disc Type Multi-CD Player.
- If the Multi-CD player cannot operate properly, an error message such as “ERROR-14” is displayed. Refer to Multi-CD Player Owner’s Manual.
- If there are no discs in the Multi-CD player magazine, “No Disc” is displayed.
- “LOADING” will be displayed in the following cases:
  * If the disc in the extra tray in selected.
  * If the disc in moved from the extra tray to the magazine.
  (Refer to the 50-Disc Type Multi-CD Player Owner’s Manual.)
- You cannot use the “Ejecting a Single Disc”, “Frequency Play”, “Music Group Play” or “ABC Disc Title Search” functions with this product.

When playing a CD TEXT disc on a CD TEXT compatible Multi-CD Player:
- You can use the following two functions. Refer to Multi-CD Player’s Owner’s Manual for operation details.
  * Title display switching
  * Title scroll
- You cannot switch to the Disc Title Input mode in the Detailed Setting Menu.

8.2 SPECIFICATIONS

Specifications

General

Power source ..... 14.4 V DC (10.8 – 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10.0 A
Dimensions
(mounting size) ..... 178 (W) × 50 (H) × 155 (D) mm
(front face) ..... 188 (W) × 58 (H) × 20 (D) mm
Weight ..... 1.8 kg

Audio

Maximum power output ..... 45 W × 4
45 W × 2 ch/4 Ω + 70 W × 1 ch/2 Ω (for Subwoofer)
Continuous power output ..... 27 W × 4
(DIN45324, +B = 14.4 V)
Load impedance ..... 4 Ω (4 – 8 Ω [2 Ω for 1 ch] allowable)
Preout maximum output
level/output impedance ..... 4.0 V/100 Ω
Equalizer (3-Band Parametric Equalizer)
(Low) ..... Frequency: 40/80/100/160 Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Level: ±12 dB
(Mid) ..... Frequency: 200/500/1k/2k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Level: ±12 dB
(High) ..... Frequency: 3.15k/8k/10k/12.5k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Level: ±12 dB
Loudness contour
(Low) ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
(Mid) ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
(High) ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)
HPF
Frequency ..... 50/80/125 Hz
Slope ..... –12 dB/oct.
Subwoofer
Frequency ..... 50/80/125 Hz
Slope ..... –18 dB/oct.
Gain ..... ±12 dB
Phase ..... Normal/Reverse

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Frequency characteristics ..... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 95 dB (1 kHz) (IEC-A network)
Dynamic range ..... 94 dB (1 kHz)
Number of channels ..... 2 (stereo)

FM tuner

Frequency range ..... 87.5 – 108 MHz
Usable sensitivity
..... 11 dBf (1.0 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity .... 16 dBf (1.7 µV/75 Ω, mono)
Signal-to-noise ratio ..... 70 dB (IEC-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

MW tuner

Frequency range ..... 531 – 1,602 kHz
Usable sensitivity ..... 18 µV (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

LW tuner

Frequency range ..... 153 – 281 kHz
Usable sensitivity ..... 30 µV (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

Note:

- Specifications and the design are subject to possible modification without notice due to improvements.

Service Manual

ORDER NO.
CRT2300

CD MECHANISM MODULE

CX-916

- **This service manual describes the operation of the CD mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Module	Mechanism Unit
DEH-P400/X1N/UC DEH-P4000/X1N/UC DEH-P4050/X1N/ES	CRT2308	CXK5200	CXB3100
DEH-P3000R/X1N/EW	CRT2309	CXK5200	CXB3100
DEH-P200/X1N/UC DEH-P300/X1N/UC DEH-P3000/X1N/UC	CRT2310	CXK5200	CXB3100
DEH-P20/X1N/UC DEH-P2000/X1N/UC DEH-P2050/X1N/ES	CRT2311	CXK5200	CXB3100
DEH-2000R/X1N/EW DEH-2020R/X1N/GR DEH-2030R/X1N/EW	CRT2312	CXK5200	CXB3100
DEH-10/X1N/UC DEH-1000/X1N/UC DEH-1050/X1N/ES	CRT2313	CXK5200	CXB3100

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PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

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1. CIRCUIT DESCRIPTIONS

The LSI (UPD63710GC) used on this unit comprises five main blocks ; the pre-amp section, servo, signal processor, DAC and CD text decoder (not used on this model). It also equips with nine automatic adjustment functions.

1.1 PRE-AMP SECTION

This section processes the pickup output signals to create the signals for the servo, demodulator and control.

The pickup output signals are I-V converted by the pre-amp with the built-in photo-detector in the pickup, then added by the RF amp to obtain RF, FE, TE, TE zero cross and other signals.

This pre-amp section is built in the servo LSI UPD63710GC (IC201). The following describes function of each section.

Since this system has a single power supply (+5V), the reference voltage for this LSI and pickup are set to REFO (2.5V). The REFO is obtained by passing the REFOUT from the LSI through the buffer amplifier. The REFO is output from Pin 89 of this LSI. All measurements are done using this REFO as reference.

Note : During the measurement, do not try to short the REFO and GND.

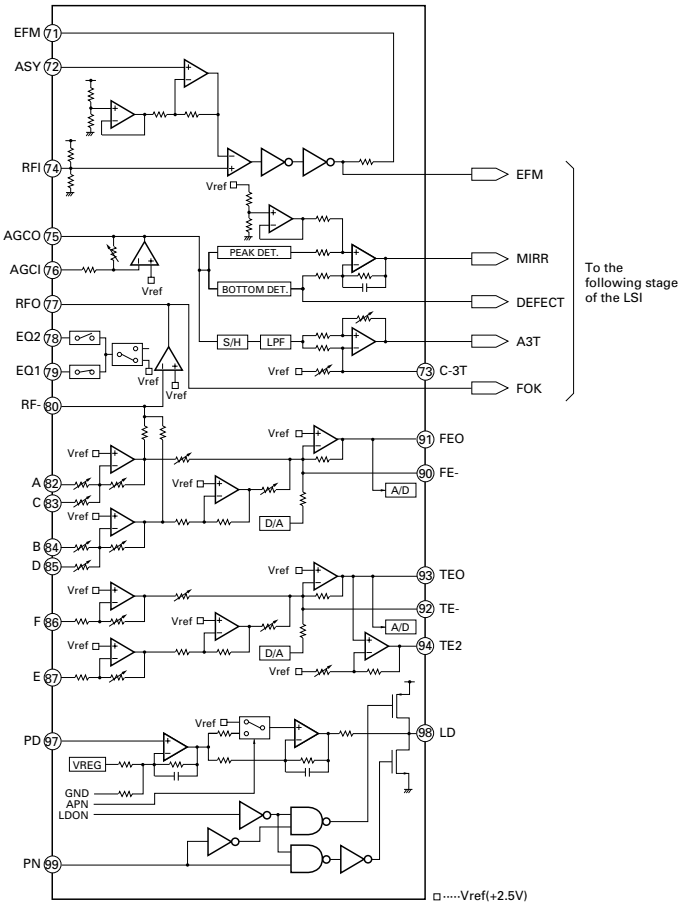


Fig.1 : BLOCK DIAGRAM OF BUILT-IN RF AMPLIFIER

1) APC Circuit (Automatic Power Control)

When the laser diode is driven with constant current, the optical output has large negative temperature characteristics. Thus, the current must be controlled from the monitor diode so that the output may be constant. APC circuit is for it. The LD current is obtained by measuring the voltage between LD1 and V+5. The value of this current is about 35mA.

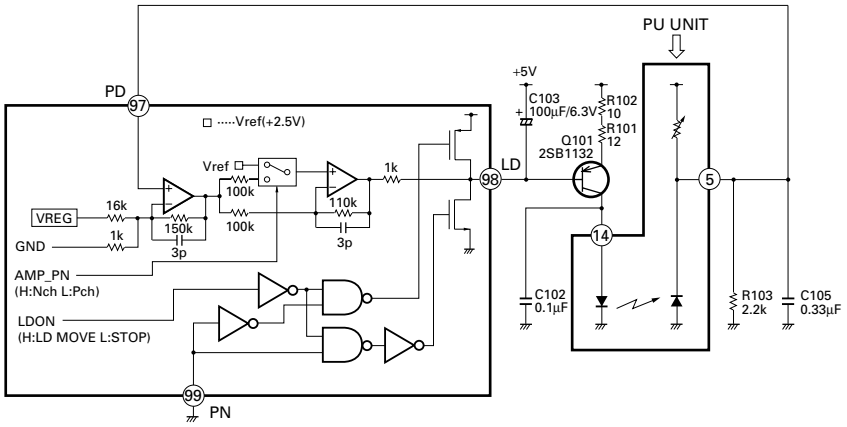


Fig.2 : APC CIRCUIT

2) RF Amplifier and RFAGC Amplifier

The photo-detector outputs (A + C) and (B + D) are added, amplified and equalized on this LSI and then output to the RFI terminal as the RF signal. (The eye pattern can be checked by this signal.)

The RFI voltage low frequency component is :

$$RFI = (A + B + C + D) \times 3.2$$

RFI is used on the FOK generator circuit and RF offset adjusting circuit.

R214 is an offset resistor for maintaining the bottom reference voltage of the RFI signal at 1.5 VDC. The D/A output used for the RF offset adjustment (to be described later) is entered via this resistor.

After the RFI signal from Pin 77 is externally AC coupled, entered to Pin 76 again, then amplified on the RFAGC amplifier to obtain the RFO signal.

The RFAGC adjustment function (to be described later) built-in the LSI is used for switching feedback gain of the RFAGC amplifier so that the RFO output may go to 1.5 ± 0.3Vpp.

The RFO signal is used for the EFM, DFCT, MIRR and RFAGC adjustment circuits.

3) RFOK Circuit

This circuit generates the signal that is used for indicating the timing of closing the focus or state of the focus close currently being played. This signal is output from Pin 4 as the FOK signal. It goes high when the focus close and in-play.

The RFOK signal is generated by holding DC level of the RFI at its peak with the succeeding digital section, then comparing it at a specific threshold level. Thus, the RFOK signal goes high even if the pit is absent. It indicates that the focus close can take place on the disc mirror surface, too.

This signal is also supplied to the micro computer via the low pass filter as the FOK signal and used for the protection and the RF amplifier gain switching.

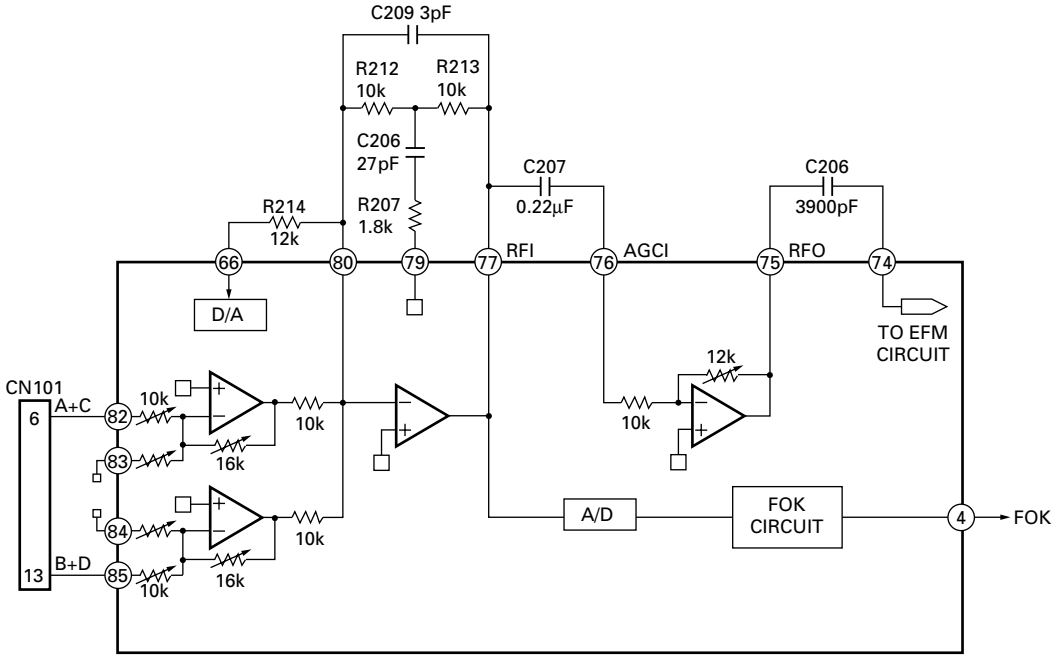


Fig.3 : RFAMP, RFAGC AND FOK CIRCUIT

4) Focus Error Amplifier

The photo-detector outputs (A + C) and (B + D) are passed through a differential amplifier and an error amplifier, and then (A + C – B – D) is output from Pin 91 as the FE signal. The FE voltage low frequency component is :

$$FE = (A + C - B - D) \times \frac{16k}{10k} \times \frac{(80k//300k)}{20k}$$

$$= (A + C - B - D) \times 5$$

Using REFO as the reference, an S-curve of approximately 1.5 Vpp is obtained for the FE output. The final-stage amplifier cutoff frequency is 11.4 kHz.

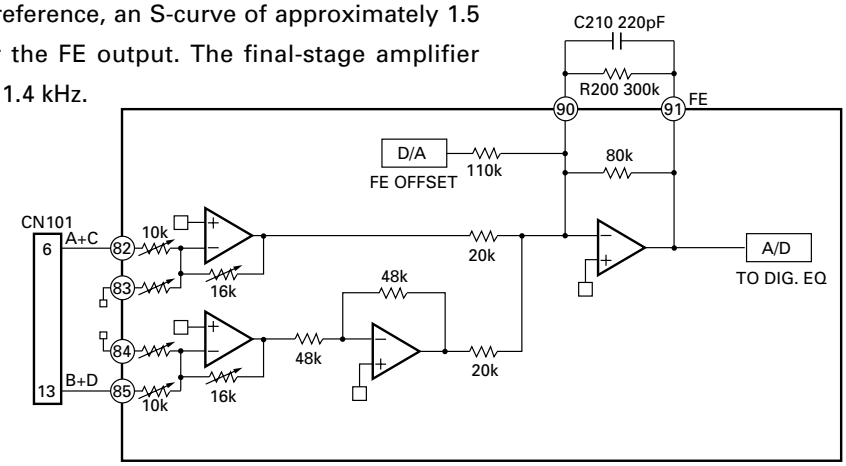


Fig.4 : FOCUS ERROR AMPLIFIER

5) Tracking Error Amplifier

The photo-detector outputs E and F are passed through a differential amplifier and an error amplifier, and then (E – F) is output from Pin 93 as the TE signal. The TE voltage low frequency component is :

$$TE = (E - F) \times \frac{224k}{(56k+27k)} \times \frac{80k}{38k}$$

$$= (E - F) \times 5.7 \text{ (Effective LSI output is 5.0).}$$

Using REFO as the reference, the TE waveform of approximately 1.3 Vpp is obtained for the TE output. The final-stage amplifier cutoff frequency is 20 kHz.

6) Tracking Zero Crossing Amplifier

TEC signal (the tracking zero crossing signal) is obtained by multiplying the TE signal four times. It is used for locating the zero crossing points of the tracking error. The zero cross point detection is done for the following two reasons :

① To count tracks for carriage moves and track jumps.

② To detect the direction in which the lens is moving when the tracking is closed (it is used on the tracking brake circuit to be described later).

The TEC signal frequency range is 300 Hz to 20 kHz.

TEC voltage = TE level × 4

Theoretical TEC level is 5.2V. The signal exceeds D-range of the operational amplifier and thus is clipped. It, however, can be ignored since this signal is used by the servo LSI only at the zero crossing point.

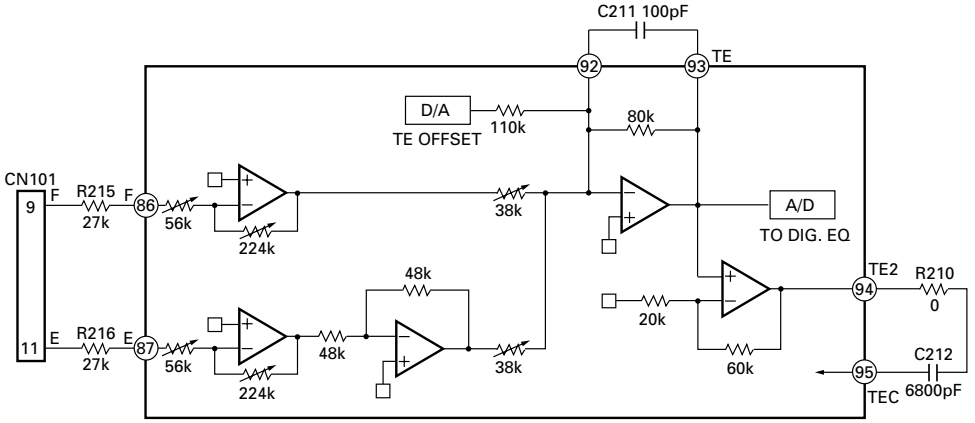


Fig.5 TRACKING ERROR AMPLIFIER AND TRACKING ZERO CROSSING AMPLIFIER

7) DFCT (Defect) Circuit

The DFCT signal is used for detecting defects on the mirrored disc surface. It allows monitoring from the HOLD pin (Pin 2). It goes high when defects are found on the mirrored surface.

The DFCT signal is generated by comparing the RF amplified signal (which is obtained by bottom holding the RFO signal) at a specific threshold level by the succeeding digital section.

Stains or scratches on the disc can constitute the defects on the mirrored disc surface. Thus, as long as the DFCT signal remains high in the LSI, the focus and tracking servo drives are held in the current state so that a better defect prevention may be ensured.

8) 3TOUT Circuit

The 3TOUT signal is generated by entering disturbance to the focus servo loop, comparing phase of fluctuations of the RF signal 3T component against that of the FE signal at that time, then converting the signal to DC level. This signal is used for adjusting bias of the FE signal (to be described later). This signal is not output from the LSI, thus its monitoring is not available.

9) MIRR (Mirror) Circuit

The MIRR signal shows the on track and off track data, and is output from Pin 3.

When the laser beam is

On track : MIRR = "L"

Off track : MIRR = "H"

This signal is used on the brake circuit (to be described later) and also as the trigger to turn on track counting when jumping take place.

The MIRR signal is supplied to the micro computer, too, for the protection purpose.

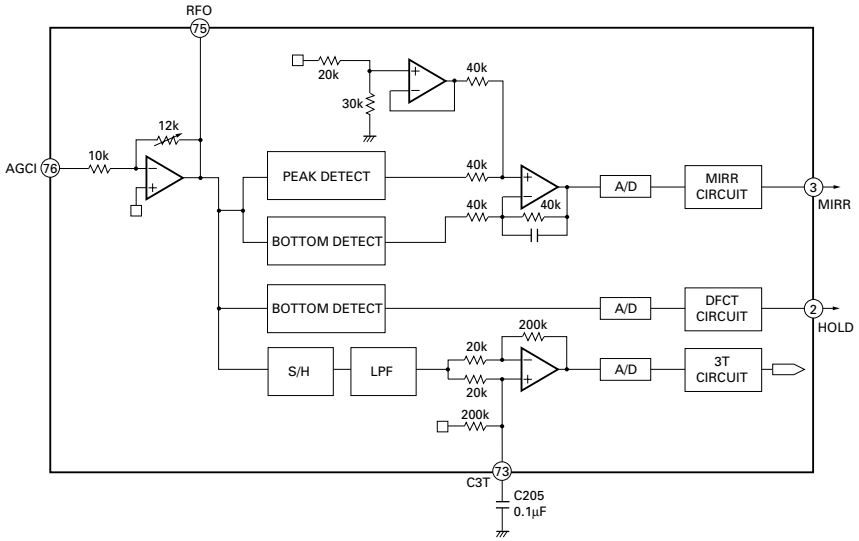


Fig.6 : DFCT, MIRR AND 3T DETECTION CIRCUIT

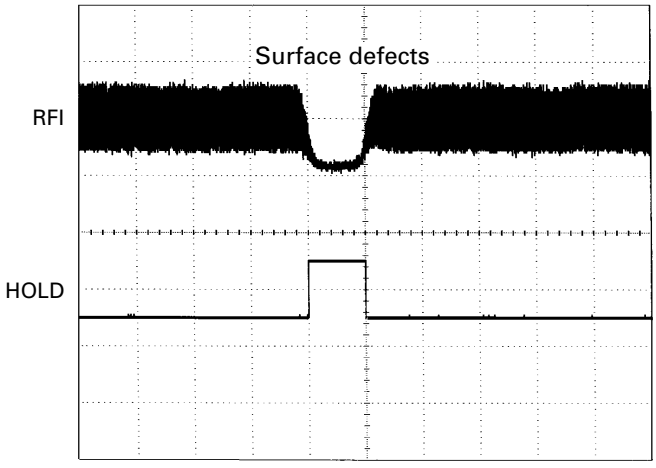


Fig.7 : HOLD OUTPUT WAVEFORM
(When surface defects are present)

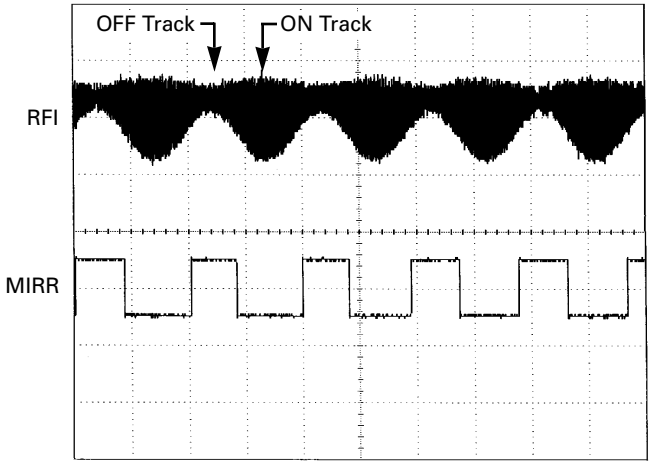


Fig.8 : MIRR OUTPUT WAVEFORM
(When an access is made)

10) EFM Circuit

This circuit is used for converting the RF signal to digital signal consisting of "0" and "1". The RFO signal from Pin 75 is externally AC coupled, entered to Pin 74, then applied to the EFM circuit.

Loss of the RF signal due to scratches or stains on the disc, or vertical asymmetry of the RF due to variations in the discs manufactured can't be eliminated by AC coupling alone. This circuit, therefore, controls the reference voltage ASY on the EFM comparator by use of the fact that "0" and "1" appear fifty fifty in the EFM signal. By this arrangement, the comparate level is constantly maintained at almost center of the RFO signal level. The reference voltage ASY is generated when the EFM comparator output is passed through the low pass filter. The EFM signal is output from Pin 71. It is a 2.5 Vp-p amplitude signal centering on REFO.

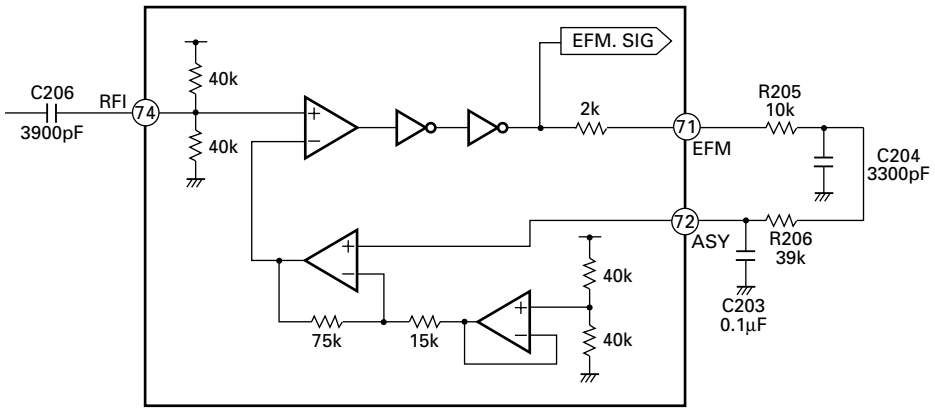


Fig.9 : EFM CIRCUIT

1.2 SERVO SECTION (UPD63710GC : IC201)

The servo section controls the operations such as error signal equalizing, in focus, track jump and carriage move. The DSP is the signal processing section used for data decoding, error correction and interpolation processing, among others.

This circuit implements analog to digital conversion of the FE and TE signals generated on the pre-amplifier, then outputs them through the servo block as the drive signal used on the focus, tracking and carriage system. The EFM signal is decoded on the signal processing section and finally output via the D/A converter as the audio signal. The decoding process also generates the spindle servo error signals which is fed to the spindle servo block to generate the spindle drive signal.

The focus, tracking, carriage and spindle drive signals are then amplified on the driver IC BA5985FM (IC301) and fed to respective actuators and motors.

1) Focus Servo System

The focus servo main equalizer is consisted of the digital equalizer. Fig.10 shows the focus servo block diagram.

When implementing the focus close on the focus servo system, the lens must be brought within the in-focus range. Therefore, the lens is moved up and down according to the triangular focus search voltage to find the focus point. During this time, the spindle motor is kicked and kept rotating as a set speed.

The servo LSI monitors the FE and RFOK signals and automatically carries out the focus close at an appropriate point.

The focus closing is carried out when the following three conditions are met :

① The lens approaches the disc from its current position.

② RFOK = "H"

③ The FZC signal is latched at high after it has once crossed the threshold set on the FZD register (Edge of the FZD).

As the result, the FE (= REFO) is forced to low.

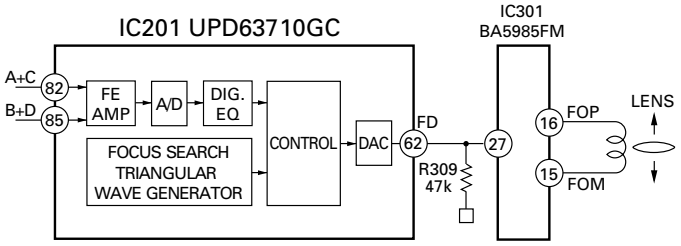


Fig.10 : FOCUS SERVO BLOCK DIAGRAM

When the above conditions are all met and the focus is closed, the XSI pin goes to low from the current high, then 40 ms later, the microcomputer begins to monitor the RFOK signal after it that has been passed through the low pass filter.

When the RFOK signal is recognized as low, the micro computer carries out various actions including protection.

Fig.11 a series of operations carried out relevant to the focus close (the figure shows the case where focus close is not available).

You can check the S-curve, search voltage and actual lens behavior by selecting the Display 01 for the focus mode select in the test mode, and then pressing the focus close button.

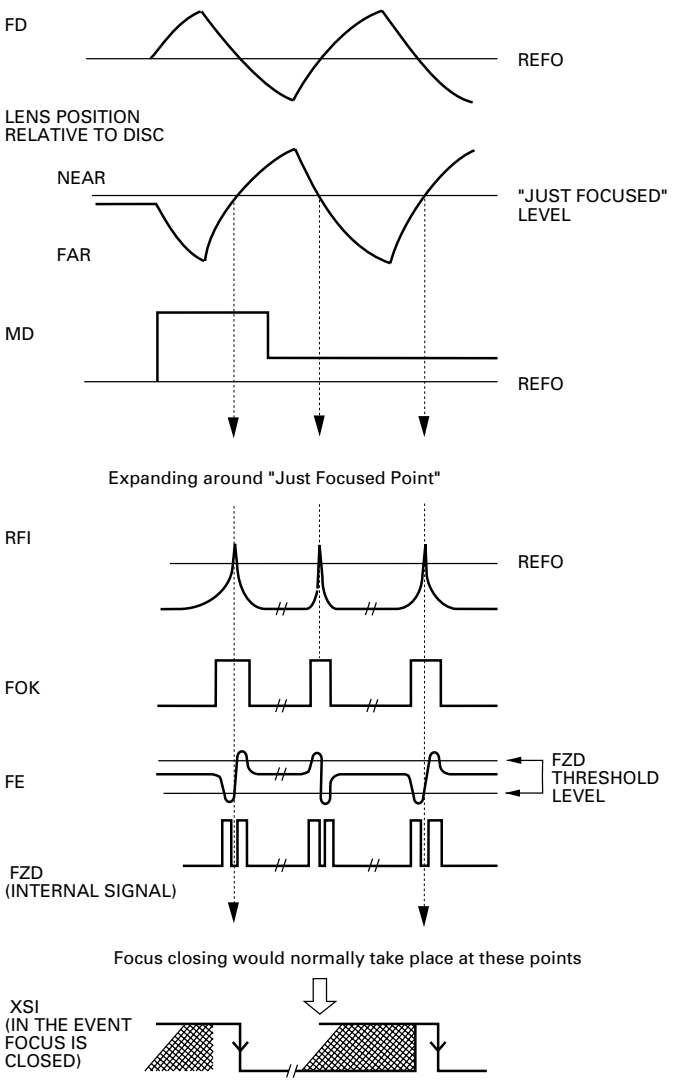


Fig.11 : FOCUS CLOSE SEQUENCE

2) Tracking Servo System

The digital equalizer is employed for the main equalizer on the tracking servo. Fig.12 shows the tracking servo block diagram.

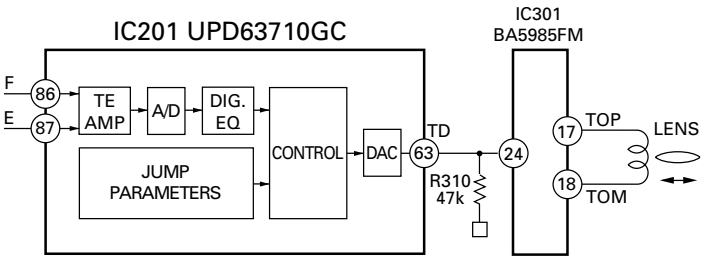


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

a) Track jump

When the LSI receives the track jump command from the microcomputer, the operation is carried out automatically by the auto sequence function of the LSI. This system has five types of track jumps used for the search : 1, 4, 10, 32 and 32 × 3. In the test mode, in addition to three jumps (1, 32 and 32 × 3), move of the carriage can be check by mode selection. For track jumps, the microcomputer sets almost half of tracks (5 tracks for 10 tracks, for instance) and counts the set number of tracks using the TEC signals. When the microcomputer has counted the set number of tracks, it outputs the brake pulse for a fixed period of time (duration can be specified with the command) to stop the lens. In this way, the tracking is closed and normal play is continued.

To improve the servo loop retracting performance just after the track jump, the brake circuit is turned on for 50 ms after the brake pulse has been terminated to increase gain of the tracking servo.

Fast forward and reverse operations are realized by through consecutive signal track jumps. The speed is about 10 times as fast as that in the normal mode.

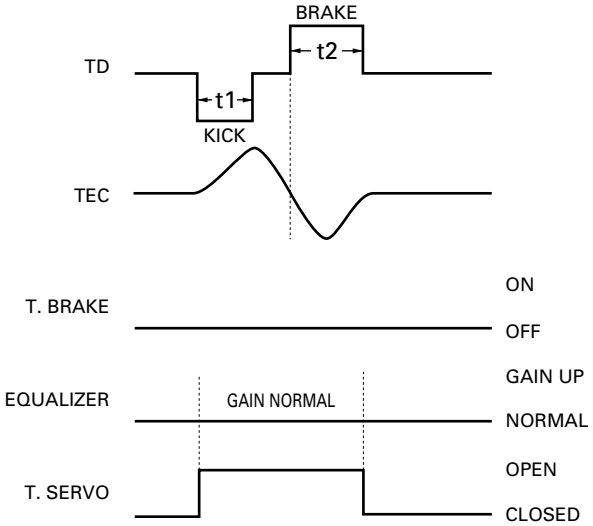


Fig.13 : SINGLE TRACK JUMP

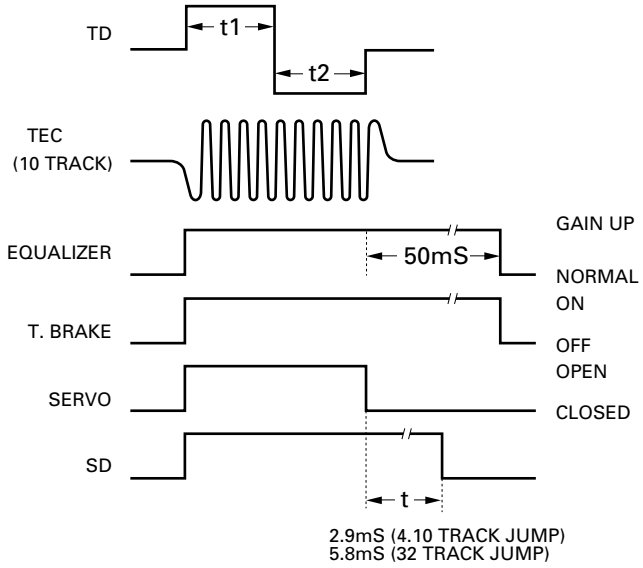
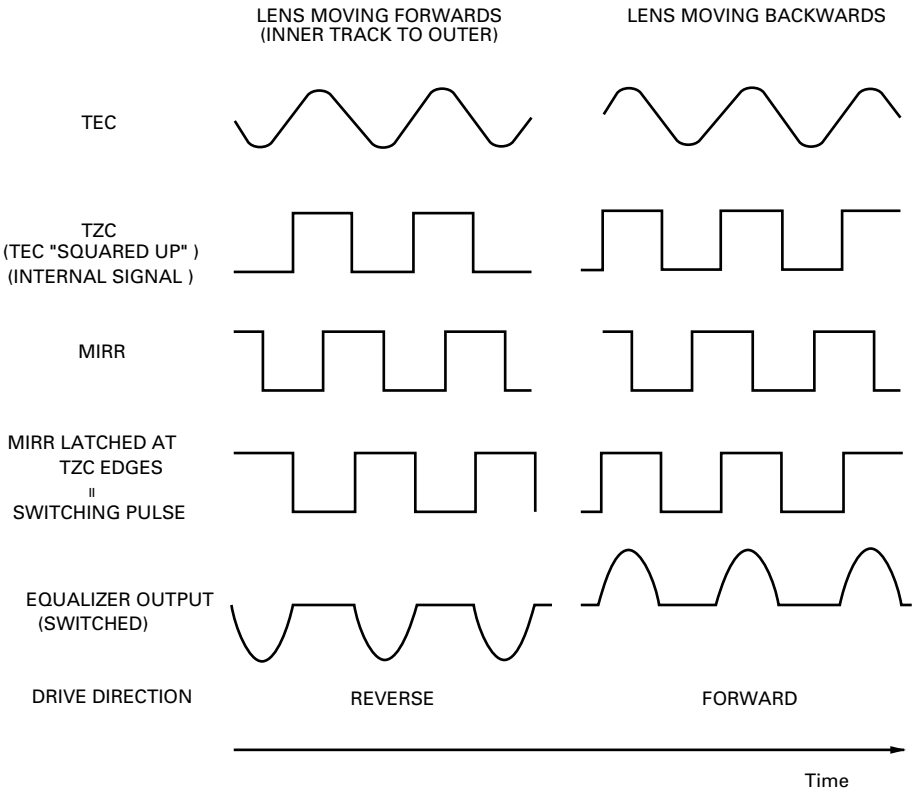


Fig.14 : MULTI-TRACK JUMP

b) Brake Circuit

The servo retracting performance can be deteriorate during the setup or track jump operation. In this connection, the brake circuit is used to ensure steady retract of the tracking servo. The brake circuit detects in which direction the lens is moving, then slows down its move by outputting the drive signal that moves the lens into the opposite direction alone. Track slippage direction is determined by referencing the TEC and MIRR signals and their phase.



Note : Equalizer output assumed to hava same phase as TEC.

Fig.15 : TRACKING BRAKE CIRCUIT

3) Carriage Servo System

The carriage servo supplies the tracking equalizer's low-frequency component (lens position data) output to the carriage equalizer, then, after providing a fixed amount of gain to it, outputs the drive signal from the LSI. This signal is then applied to the carriage motor via the driver IC.

When the lens offset reaches a certain level during play, the entire pickup must be moved into the forward direction. Therefore, the equalizer gain is set to the level that allows to generate a voltage higher than the carriage motor starting voltage. In actual operations, a certain threshold level is set for the equalizer output by the servo LSI so that the drive voltage may be output from the servo LSI only when the equalizer output exceeds the threshold level. This arrangement helps reducing power consumption. Also, due to disc eccentricity or other factors, the equalizer output may cross the threshold level a number of times. In this case, the drive voltage output from the LSI will have pulse-like waveform.

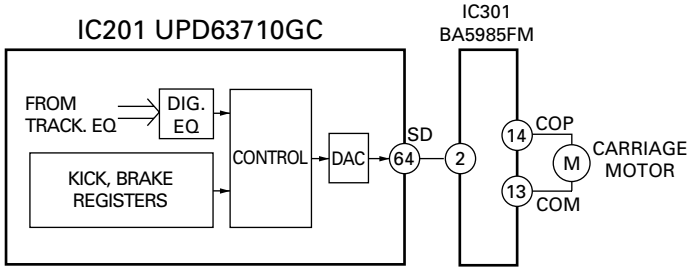


Fig.16 : CARRIAGE SERVO BLOCK DIAGRAM

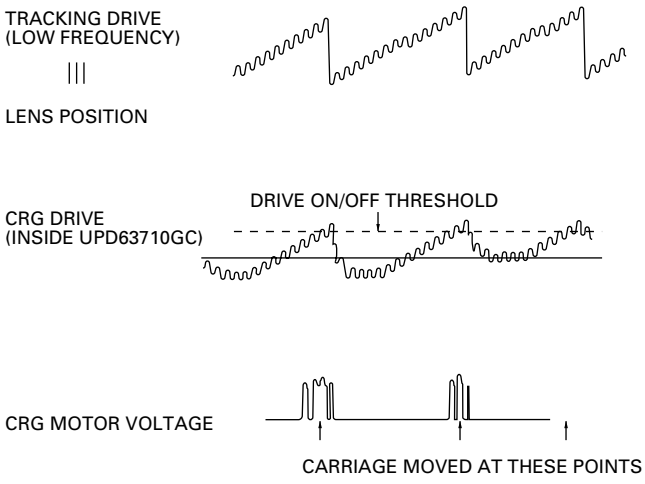


Fig.17 : CARRIAGE SIGNAL WAVEFORM

4) Spindle Servo System

The spindle servo has the following modes.

① Kick :

This mode is used for accelerating the disc rotation during setup.

② Offset :

(a) After the kick is over in the setup, this mode is turned on until changing to rough servo mode.

(b) When focus is lost during play, this mode is turned on until the focus is restored.

Both of the above are used for maintaining the disc rotation rate near to the specified rate.

③ Applicable servo :

The CLV servo mode is turned on for the normal operations.

In the EFM demodulation block, the frame sync signal and internal counter output signal are sampled for every WFCK/16 and a signal is produced for indicating whether or not they are matching.

They are determined to be asynchronous only when this signal fails to match 8 times in succession. In all other cases, above two signals are assumed to be synchronous. In the applicable servo mode, the retracting servo is automatically selected if the two signals are synchronous. If not, the regular servo is automatically selected.

④ Brake :

This mode is turned on when stopping the spindle motor.

The microcomputer outputs the brake voltage through the servo LSI. The LSI monitors the EFM waveform and, if its longest pattern exceeds a certain interval (if the rotation is sufficiently slow), the flag is set the LSI and the microcomputer turns off the brake voltage. When the flag is not up within a specified period time, the microcomputer switches the mode from the brake to the stop mode, and maintains this mode for a fixed period of time. If this stop mode is continued for a fixed period of time, the disc will be ejected.

⑤ Stop :

This mode is used for powering on the system and the eject operation. When this mode is turned on, voltage across the spindle motor is 0V.

⑥ Rough servo :

This mode is used for when the carriage feed (carriage mode for the long search, etc.) is turned on. The linear speed is calculated from the EFM waveform and high or low level is entered to the spindle equalizer. In the test mode, this mode is also used for the grating check.

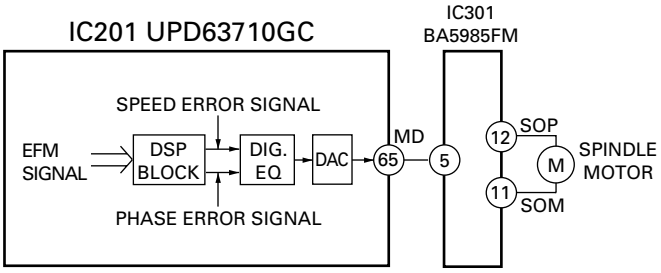


Fig.18 : SPINDLE SERVO MOTOR BLOCK DIAGRAM

1.3 AUTOMATIC ADJUSTMENT FUNCTIONS

Every circuit adjustment on the CD-LSI of this system is automated.

Every circuit adjustment is automatically implemented when the disc is inserted or the CD mode is selected from the source key. The following describes how the adjustments are executed.

1) FZD Cancel Setting

This setting is used for executing the focus close operation without fail.

When power is turned on, the FE offset level is read and a voltage opposite to this offset value is written to the CRAM on the IC to cancel the offset. In this manner, the FZD threshold level can be set to a constant value (+240mV), thereby ensuring to meet one of the requirements for the IC to execute the focus close that "the FZD signal is latched at high".

2) Automatic Adjustment of TE, FE and RF Offset

Using REFO as the reference, this function adjusts the pre-amp TE, FE and RF offsets to the respective target value when power is turned on (targets values of the TE, FE and RF are 0, 0 and –1V, respectively).

The following is the adjustment procedure :

(1) Respective offset (LD off) is read by the microcomputer via the servo LSI.

(2) The microcomputer calculates the voltages to be corrected from the read values, then sets them to the specified field.

3) Automatic Adjustment of Tracking Balance (T. BAL)

This adjustment is used for eliminating differences between the pickup E and F channels outputs by adjusting gain of the amplifier on the LSI. In the actual operation, the TE waveform is adjusted so that it may be vertically symmetric with REFO.

The following is the adjustment procedure :

(1) Make sure the focus close is complete.

(2) Kick the lens in the radial direction to generate the TE waveform.

(3) At this time, the microcomputer reads the TE signal offset value (via the servo LSI) being calculated by the LSI.

(4) The microcomputer determines if the read offset value is positive, negative or zero.
If the offset value = 0, the adjustment is terminated.
If the offset value = A positive or negative value, gain of the E and F channels amplifiers are modified according the predetermined rule.

Then above steps (2) through (4) are repeated until the "Offset value = 0" or "Specified limit count" is reached.

4) Automatic Adjustment of FE Bias

This adjustment is intended at maximizing the RFI level by optimizing the focus point in-play. This adjustment utilizes the phase difference between the RF waveform 3T level and the focus error signal when disturbance is applied.

Since disturbance is applied to the focus loop, this adjustment is designed to take place in the same timing as the auto gain control (to be described later).

The following is the adjustment procedure :

(1) Disturbance is injected to the focus loop by the command from the microcomputer (within the servo LSI).

(2) The LSI detects fluctuation of the RF signal 3T component level.

(3) The LSI determines relationship between fluctuation of the 3T component and the injected disturbance to detect magnitude and direction of the off-focus introduced.

(4) The microcomputer reads the detected results from the LSI.

(5) The microcomputer calculates necessary correction, then hands the calculated value to the bias adjustment term set on the LSI.

This adjustment is repeated several times, as it is so with the auto gain control, to ensure higher accuracy.

5) Focus and Tracking Automatic Gain Control

This function is used for implementing automatic control of the focus and tracking loop gain.

The following is the adjustment procedure :

(1) Inject disturbance to the servo loop.

(2) Extract the error signal (FE and TE) generated at when the disturbance is applied to obtain the signals G1 and G2 via the B.P.F.

(3) The microcomputer reads the G1 and G2 signals via the LSI.

(4) Based on the necessary correction calculated by the microcomputer, the LSI performs the loop gain adjustment.

Above adjustments are repeated several times to ensure higher adjustment accuracy.

6) Automatic RF Level Adjustment (RFAGC)

This adjustment is used for implementing intended signal transmission successfully by adjusting unevenness of the RF signal (RFO) levels, that results from disc and machine relevant factors, to a target value. The adjustment is actually done by varying gain of the amplifier provided between the RFI and RFO.

The following is the adjustment procedure :

(1) Using the command, the microcomputer reads the output from the RF level detection circuit on the servo LSI.

(2) Based on the read value, the microcomputer calculates an amplifier gain that will produce the target RFO level.

(3) The microcomputer sends the corresponding command to the servo LSI so that the above gain value may be set.

This adjustment takes place at the following timing :

- When the focus close alone is completed during the setup process.
- Just before the setup is completed (just before the play takes place).
- After the off-focus has been corrected during the play.

7) Adjustment of Pre-Amp Stage Gain

It is used for adjusting the entire RFAMP (FE, TE and RF amplifiers) to +6dB or +12dB depending on given gain level when reflected light from the disc is significantly below the required level due to stained lens. This phenomena can be noticed when playing back the CD-RW.

The following is the adjustment procedure :

When reflected light from disc is judged to be significantly below the required level during the setup, set the entire RFAMP to +6dB or +12dB. In this case, if the gain is modified, the setup have to be repeated from the first step.

Through the adjustment, if you judged the play becomes available by setting the entire RFAMP to +6dB, +6dB should be selected for the setup next time on.

See the figure below :

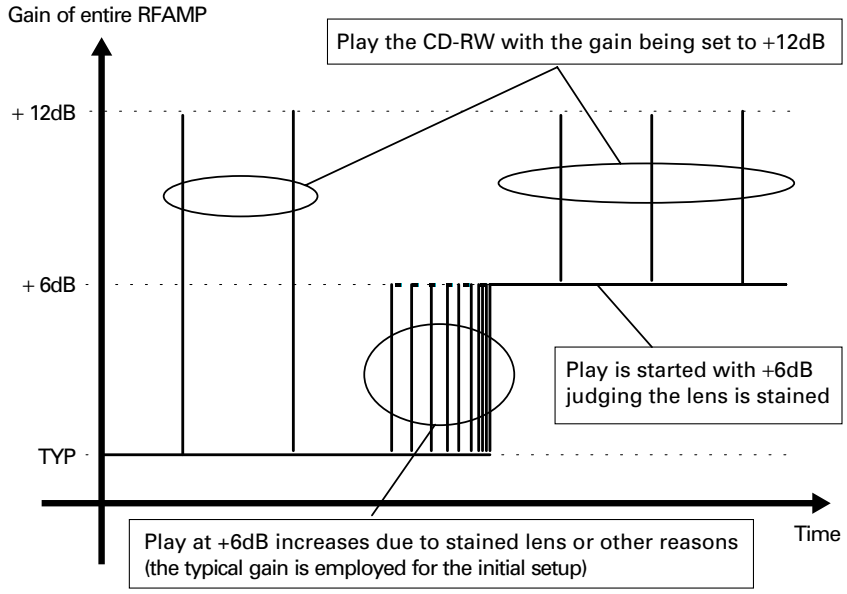

Gain of entire RFAMP
Play the CD-RW with the gain being set to +12dB
+ 12dB
+ 6dB
TYP
Play is started with +6dB judging the lens is stained
Time
Play at +6dB increases due to stained lens or other reasons (the typical gain is employed for the initial setup)

Fig.19 : CONCEPTUAL DIAGRAM OF PRE-AMP GAIN ADJUSTMENT

8) Initial Adjusting Values

All the automatic adjustments are implemented using the previous adjustment values as the initial values unless the microcomputer power (the backup power) is not turned off (though there are some exceptions).
When the backup is turned off, automatic adjustment is executed based on the initial values rather than the previous adjustment values.

9) Displaying Coefficients After Adjustment

You can display and check results of some automatic adjustments (FE and RF offset, FZD cancel and F / T / RFAGC) from the test mode. The following coefficients are displayed in each automatic adjustment :

(1) FE and RF offset and FZD cancel

Reference value = 32 (The coefficient of 32 indicates that no adjustment was required).

The results are displayed in multiples of approximately 40 mV.

An example : When FZD cancel coefficient = 35

35 − 32 = 3

3 × 40 mV = 120 mV

Since the corrected value is approximately +120 mV, the FE offset before adjustment was −120 mV.

(2) F and T gain adjustment

Reference value = Focus/Tracking = 20

A coefficient displayed indicates an amount of adjustment conducted on the reference value.

An example : When AGC coefficient = 40

40/20 = Overall gain has bee doubled (+6dB). (The original loop gain of 1/2 has been doubled to have the targeted overall gain.)

(3) RF level adjustment (RFAGC)

Reference value = 8

Coefficient = 9 to 15 ····· The direction in which the RF level is increased (the gain is increased).

Coefficient = 7 to 0 ····· The direction in which the RF level is decreased (the gain is decreased).

Incrementing or decreasing the coefficient by "1" varies the gain by 0.7 to 1dB.

Maximum gain = Typically +6.5dB. Coefficient at this time is 15.

Minimum gain = Typically −6.0dB. Coefficient at this time is 0.

1.4 POWER SUPPLY AND LOADING SECTION

The power supply of the system uses VD (8.3V) from the mother board. VD is fed to 5 channel CD driver IC, 5V Reg IC and disc detection LED.

The microcomputer turns on or off the CD driver and the 5V using "CONT" and "CD5VON", respectively. The loading drive is turned on or off by the input signals "CDEJET" and "CDLOAD". No control terminal is provided for turning the loading drive on or off.

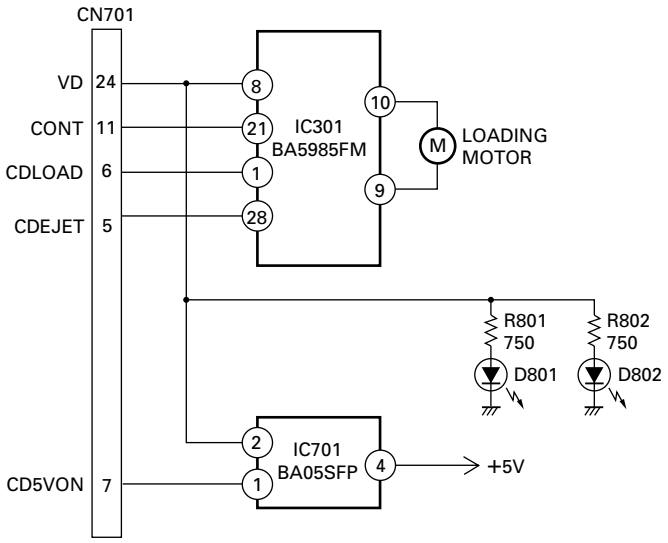
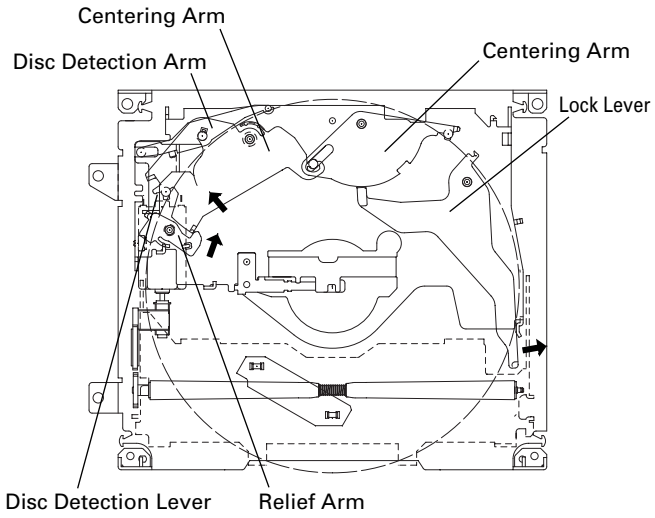


Fig.20 : POWER SUPPLY AND LOADING SECTION

2. MECHANISM DESCRIPTIONS

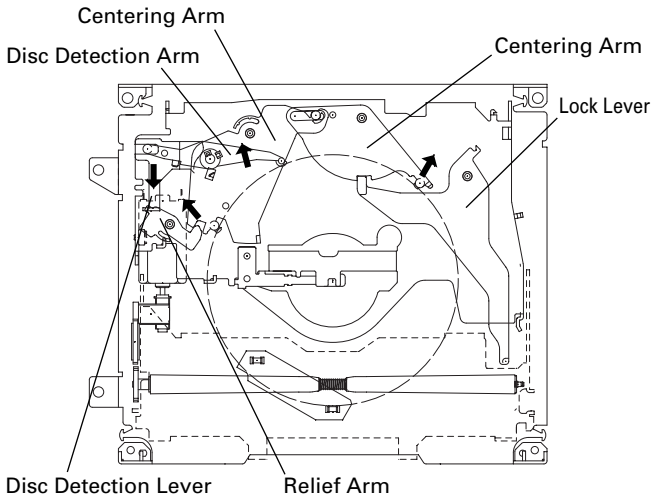
● Loading Operation (when a 12 cm disc is used)

1. Insert a 12 cm disc (the sensor turns on the motor revolution).
2. The disc pushes the Lock Lever in, thereby resetting the lock currently applied to the Centering Arms.
3. The disc further pushes the Centering Arms in.
4. The right side and left side arms are engaged to perform centering of the disc.
5. The disc pushes the Disc Detection Arm in, thereby pushing the Disc Detection Lever forward.
6. Clamping action retracts the Disc Detection Lever toward forward side, thereby rotating the Relief Arm.
7. The Relief Arm further pushes the Centering Arm in, thus detaching it from the disc.



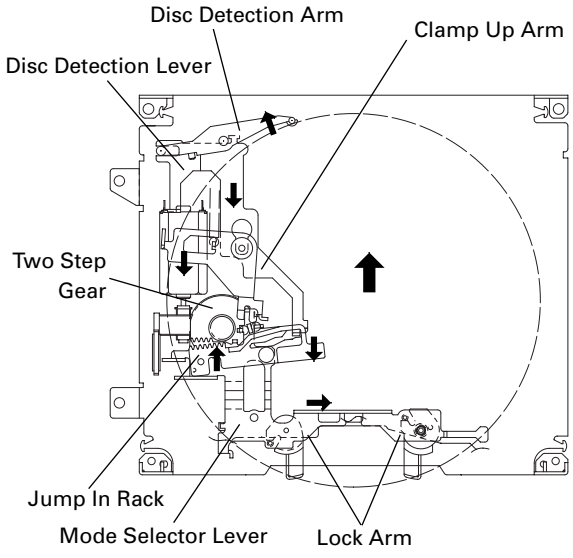
● Loading Operation (when a 8 cm disc is used)

1. Insert an 8 cm disc (the sensor turns on the motor revolution).
2. The disc does not contact against the Lock Lever, thus centering of the disc is performed by the Centering Arm being locked.
3. When the right side slot is used, the lock currently applied to the Centering Arm remains turned on even if the disc may touch the Lock Lever because the disc leaves the lever before it reaches the Centering Arm.
4. Succeeding procedures are the same as that for 12 cm discs.



● Clamping Operation

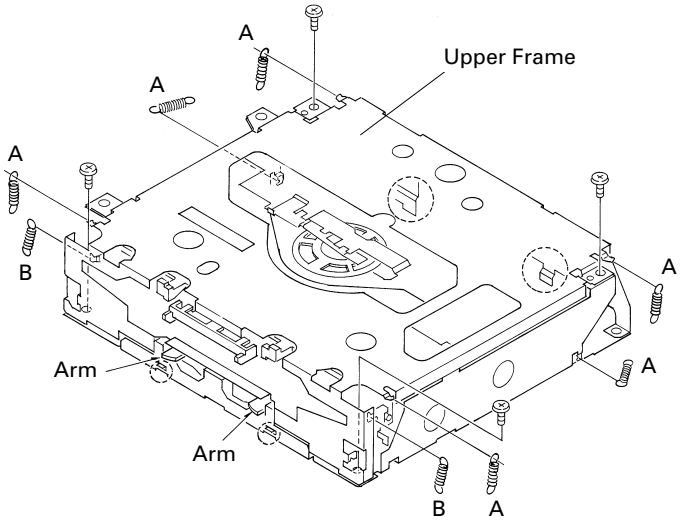
1. Insert a disc.
2. The Detection Arm pushed forward by the Detection Lever turns on rotation of the Jump In Rack.
3. The Jump In Rack then engages with the Two Step Gear and moves toward right.
4. At the same time, the Mode Selector Lever connected to the Jump In Rack starts moving toward right, thereby rotating the Lock Arm and resetting the mechanical lock. The Clamp Up Arm too is rotated by the above action and, thus, the Clamp Up Arm now being lifted by shape of the cam of the Clamp Arm is lowered.
   And, the Guide Arm is also moved down because of shape of the cam of the Mode Selector Lever.
5. By use of the cam shape, the Jump In Rack being moved toward right retracts the Disc Detection Lever in forward direction, thereby turning on rotation of the Relief Arm.



3. DISASSEMBLY

● Removing the Upper Frame

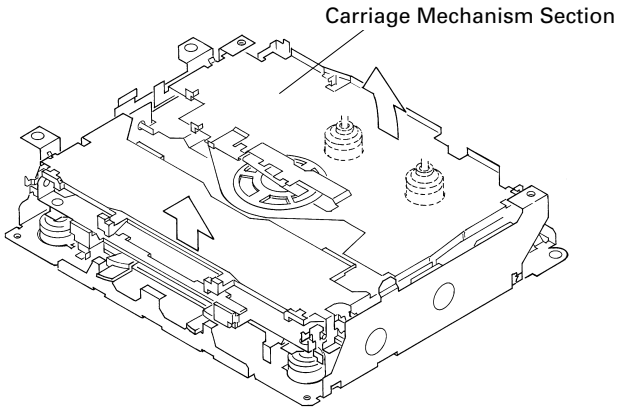
1. Remove six Springs A, two Springs B and four Screws.
2. Remove two Tabs situated on rear side of the Upper Frame, remove two Arms on the front side, then remove two Tabs on the front side.



● Removing the Carriage Mechanism

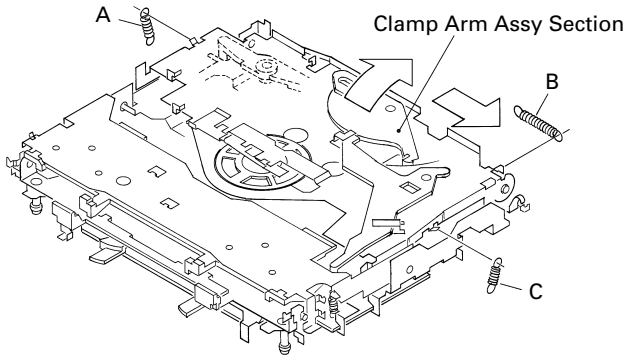
1. Disengage the Carriage Mechanism from the two dampers situated in the front side by driving it up, then disengage and remove the mechanism from the two dampers by driving it up aslant into front side direction.

Note : When assembling the Carriage Mechanism, coat the dampers with alcohol prior to the assembly.



● Removing the Clamp Arm Assy

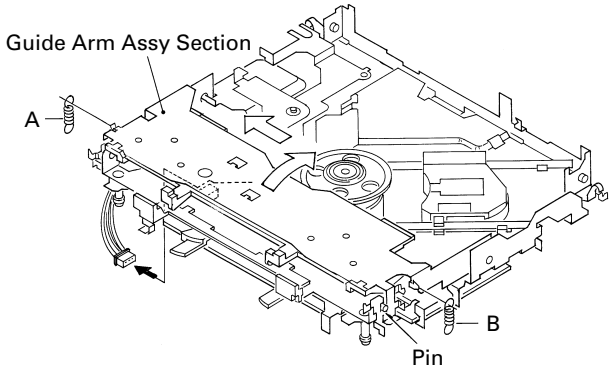
1. Remove a Spring A, a B and a Spring C.
2. Drive the Clamp Arm Assy up into rear side direction, then disengage the arm from its current position Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward right side to remove it.



● Removing the Guide Arm Assy

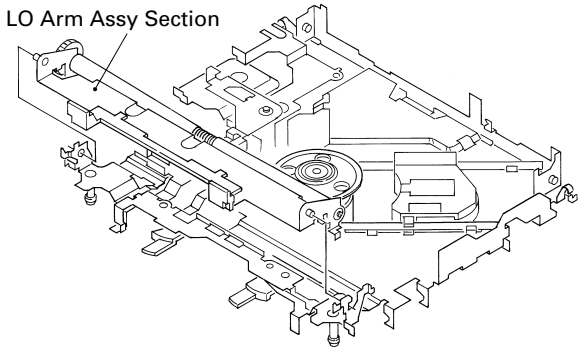
1. Remove a connector, a spring A and B
2. Drive the Guide Arm Assy up aslant into rear side direction, then remove it from a Pin. Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward left side to remove it.

Note : When assembling the guide arm assembly, route the cord inside the assembly. In this operation, care must be exercised so that cord may be caught by the gear.



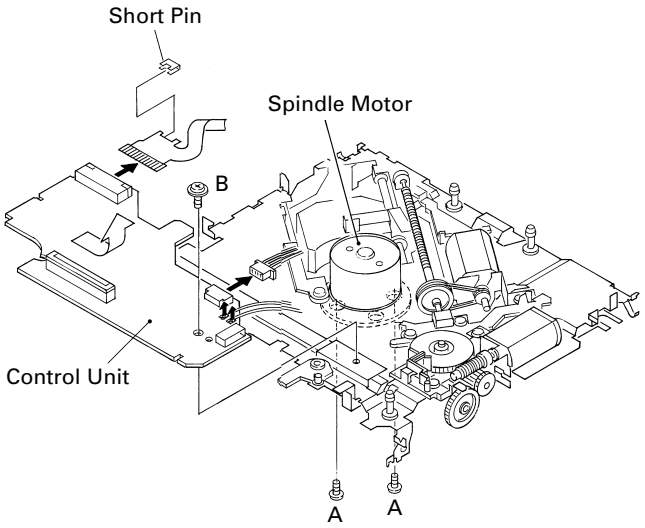
● Removing the LO Arm Assy

1. Remove two Pins to dismount the LO Arm Assy.



● Removing the Control Unit and the Spindle Motor

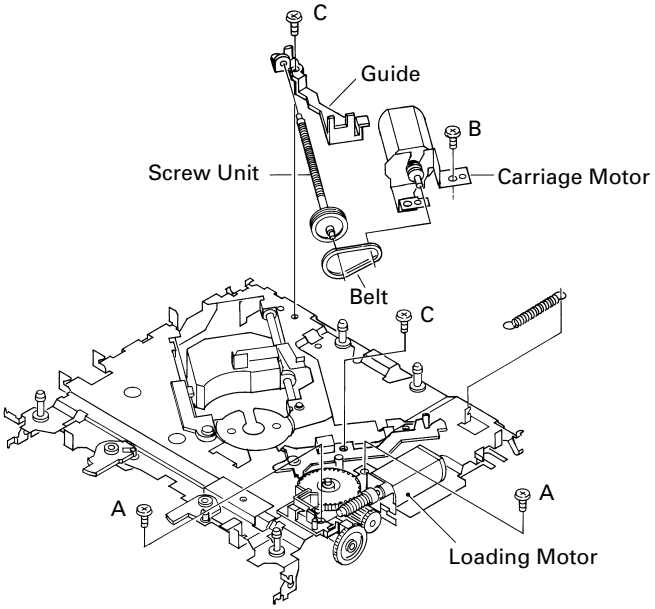
1. Remove from the connector after mounting the short pin on the flexible PCB of the pickup unit.
2. Remove two Soldered joints, then remove two Screws A.
3. Remove two connectors and a Screw B.
4. Disengage the Control Unit from two Tabs, then dismount the unit by sliding it toward left.
5. Dismount the Spindle Motor.



● Removing the Loading Motor and Carriage Motor

1. Remove the Spring and two Screws A.
2. Dismount the Loading Motor.
3. Remove the Belt, a Screw B, two Screws C, a Guide and a Screw Unit.
4. Dismount the Carriage Motor.

Note : When assembling the Belt, use care so that it may not be contaminated by grease.



● Removing the Pickup Unit

1. Remove two Screws and a Shaft.
2. Dismount the Pickup Unit.